

Understanding the Canadian D&B Financial Stress Score

THIS DOCUMENT IS INTENDED TO ADDRESS THE FOLLOWING QUESTIONS:

- What is the Financial Stress Score?
- What does the Financial Stress Score predict?
- What is the availability of the Financial Stress Score?
- How is the Financial Stress Score calculated?
- How does the Financial Stress Score perform?
- What is the Relationship between the Financial Stress Score and Failure Rates?



INTRODUCTION

The Canadian D&B Financial Stress Score (FSS), also known in some markets as the D&B Failure Score, predicts the likelihood that a business will seek legal relief from its creditors, cease business operations without paying all its creditors in full, voluntarily withdraw from business operations and leave unpaid obligations, go into receivership or reorganization, or make an arrangement for the benefit of creditors over the next 12 month period, based on the full range of data that Dun & Bradstreet has available on a business.

The Financial Stress Scoring System uses statistical probabilities to calculate the Financial Stress Score for public and private companies in the Dun & Bradstreet Data Cloud. The Score calculation is based on the chance of a business experiencing the above definition of “negative” performance over the next 12 month period. The Financial Stress Scoring models utilize the combined power of the Data Cloud with records on XXXM active Canadian businesses including payment, public filing, demographic, and financial information when available.

The integrity of the information contained in the Data Cloud is driven by our proprietary DUNSRight™ Quality Process. DUNSRight™ is our process for collecting and enhancing information. Our expert team of statisticians and economists lead the development of our Predictive Indicator solutions, the fifth and final component of the sequential DUNSRight™ process, and are responsible for turning the data in our Data Cloud into actionable business insight, enabling you to more confidently make critical risk decisions.

The Canadian D&B Financial Stress Score is part of a suite of scorecards – a scoring system – that is highly effective in helping to predict the potential insolvency of your existing and prospective customers. The solution allows you to:

- Automate decisions for increased efficiency
- Allow faster processing of large volumes of transactions
- Free up resources to look at time-intensive borderline decisions
- Enable more consistent decisions across the entire organization
- Reduce the costs associated with full-scale application and annual risk reviews
- Apply scores across an entire portfolio to quickly identify risk and opportunity
- Manage collection resources with prioritized actions for delinquent accounts
- Satisfy regulatory needs for timely, consistent and objective review of decisions at the account level

This document explains in greater detail how the Canadian Financial Stress Scoring System was developed.

CANADIAN D&B FINANCIAL STRESS SCORE

WHAT THE D&B FINANCIAL STRESS SCORE PREDICTS

The Financial Stress Score predicts a business’s likelihood of experiencing financial stress over the next 12 month period. Dun & Bradstreet defines a financially stressed business as one that seeks legal relief from its creditors, ceases business operations without paying all its creditors in full, voluntarily withdraws from business operation and leaves unpaid obligations, goes into receivership or reorganization, or makes an arrangement for the benefit of creditors over the next 12 month period, based on the information in the Dun & Bradstreet Data Cloud.

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

Note: Voluntary discontinuance involving no loss to creditors is not defined as financially stressed.

The Financial Stress Score assigns three measurements of risk:

- 1. A “Score” which falls within the range of 1001 – 1890** where 1001 represents businesses that have the highest probability of financial stress, and 1890 represents businesses with the lowest probability of financial stress. This Score provides a direct relationship between the score and the level of risk. Even odds (where probability of experiencing failure=0.5) are represented by the score of 1130. The odds of being “good” doubles for each 40 point increase. For example, a score of 1200, on a marginal basis, represents twice the risk of financial stress as a score of 1240. This score enables a customer to utilize more granular cutoffs to drive their automated decision-making process. This scale is globally consistent and the same score represents the same odds in every Dun & Bradstreet market.
- 2. A “Percentile” of 1 – 100**, where 1 represents businesses that have the highest probability of financial stress, and 100 represents businesses with the lowest probability of financial stress. The Percentile shows you where a business falls among businesses in the Data Cloud, and is most effectively used by customers to rank order their local portfolios from highest to lowest risk of business failure. The Percentile score is a local risk measure and is not transferable from one market to another.
- 3. A “Class” of 1 – 5**, which is a segmentation of the scorable 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. The Risk Class enables a customer to quickly segment their new and existing accounts into various risk groups for high-level analysis and reporting.

Table 1 shows the distribution of the Financial Stress Risk Class in the Dun & Bradstreet Business Universe. In addition, this table also displays the associated Percentile ranking and Score.

Table 1: Distribution of Financial Stress Risk Class in the Dun & Bradstreet Data Cloud

FAILURE RISK CLASS	% OF BUSINESSES WITHIN THIS CREDIT SCORE CLASS	CREDIT SCORE PERCENTILE	COMMERCIAL CREDIT SCORE
1	6%	95 - 100	1561 - 1890
2	26%	69 - 94	1493 - 1560
3	35%	34 - 68	1532 - 1492
4	32%	2 - 33	1294 - 1431
5	1%	1	1001 - 1293

AVAILABILITY OF THE FINANCIAL STRESS SCORE

A Financial Stress Score is available on approximately 1,100,000 Canadian based businesses.

The exceptions are:

- FSS will not be available (blank) for
 - Businesses which are Out of Business
 - Branch locations where the Headquarters is based in another country
 - Businesses where there is a history of unfavorable current or historical information in one or more significant principals of the business (Management) or the Dun & Bradstreet Data Cloud contains unfavorable current or historical information on the business.
 - Businesses in industries that do not lend themselves to scoring through this type of model
 - . SIC Codes 90 - 98 - Public Administration, Government Offices
 - . SIC Codes 99 – Unclassifiable
 - . SIC Code is missing or unavailable
 - Crown Corporations
 - Businesses classified as not ‘in date’ (not updated in last 24 months based on report date)
- FSS will automatically trade-up to the headquarter location score on business branch locations with headquarters in Canada.

MODEL DEVELOPMENT PROCESS

The Financial Stress Score scorecards built for Canada leverage the Dun & Bradstreet Data Cloud. All the information contained within our Data Cloud has passed through our DUNSRight™ Quality Process, driving greater accuracy, completeness, timeliness and consistency. One of the primary reasons our predictive scores are so powerful is the quality of the information used in their development.

The Financial Stress Scoring models were developed using state-of-the-art statistical modeling techniques to select and weigh the data elements that are most predictive of business failure. The resulting Financial Stress Score models are mathematical equations which have been rigorously validated, including an “out of time” validation assessing model performance in a time period that is different from the model development sample.

In the model development process, data is collected from two time periods designated 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 predictive variables and segmentation schemes are defined from this snapshot. The performance window defines the length of time the businesses in the sample are tracked to examine their behavior.

In the development of the Canadian Financial Stress Score, the observation window was December 2007 and the performance window was the twelve months from January 2008 to December 2008. A total of 616,655 active businesses were used in model development. Of this population, 612,423 were considered “good” or non-financially stressed companies in the Data Cloud and 4,232 were considered “bad”, or financially stressed companies in the Data Cloud.

From the observation window data, Dun & Bradstreet performed extensive data analysis to determine those variables which are statistically the most significant factors for predicting financial stress and calculate the appropriate weights for each. Dun & Bradstreet identified hundreds of predictive variables from evaluating a combination of both “good” and “bad” performing businesses in the Data Cloud. Appendix A contains examples of data elements which are used in calculating the score.

SCORING SYSTEM AND MODEL SELECTION

Risk behavior varies with size of a business, so Dun & Bradstreet developed a scoring system that accounts for business size. The result is a segmented solution driven by employee size. Each scorecard was developed and optimized on a more homogenous subpopulation: small businesses with fewer than 10 employees and larger businesses with 10 or more employees.

By using such segmented approach, D&B’s Financial Stress Score provides maximum risk discriminatory power, allowing for improved risk management decisions.

MODEL PERFORMANCE

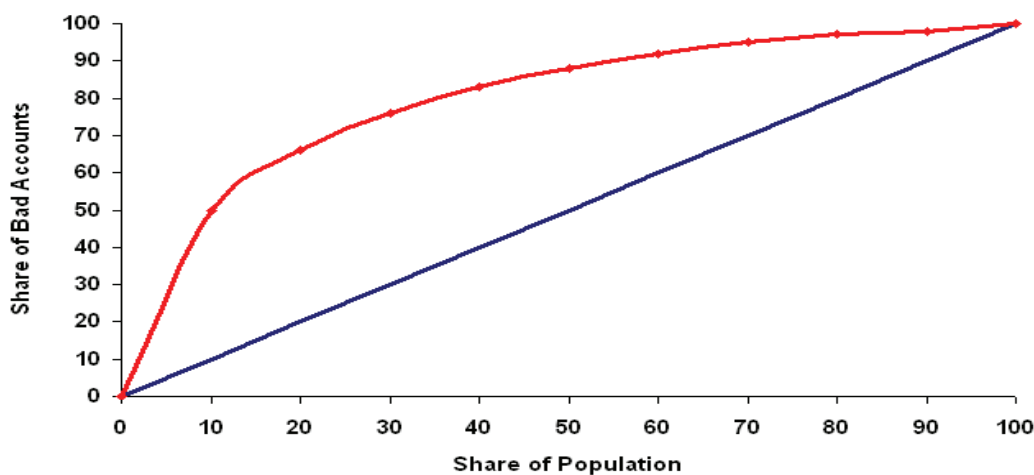
One way to measure model performance is by examining a trade-off curve. A trade-off curve is a plot of ascending accumulation of “good” businesses vs. “bad” businesses. It is useful for illustrating model performance both at a particular score and across the spectrum of score distribution.

The trade-off curve in Graph 1 illustrates the effectiveness of the Financial Stress Score. For the example, at approximately 20% of the cumulative population, the Financial Stress Score models are projected to identify approximately 66% of the cumulative “bads”. This means that if a business focused on the worst scoring 20% of their portfolio using the Financial Stress Score, they would capture 66% of the “bads” in that group.

During the course of model development, various statistics from the development sample are gathered, similar to the trade-off curve shown above. Development statistics provide useful information that can be used to help management determine credit policy related to the use of the models. For several reasons, however, statistics from model development should not be construed as precise forecasts for individual portfolios.

In addition, models are developed assuming that the relationships observed between past business characteristics and subsequent performance will hold true on future businesses. Because of this assumption, development statistics should be viewed as estimates, and not precise forecasts, of future performance at a given score.

Nevertheless, on a cumulative level models are robust tools for predicting risk in changing circumstances; higher scoring businesses as a group perform better than lower scoring businesses. Tracking the score distributions and the actual performance of customer accounts provides the most accurate projections for individual portfolios.



Graph 1: Financial Stress Score Performance across All Size Segments

RELATIONSHIP BETWEEN FINANCIAL STRESS SCORE AND PROJECTED FAILURE RATES

The national average failure rate, based on 2008 Canadian failure statistics, is 0.69%.

Table 2 provides the national average failure rates and cumulative percent of failures identified, based on information in the Dun & Bradstreet Data Cloud, for each Financial Stress Risk Class.

Table 2: National Average Failure Rate by Risk Class
(Based on 2008 Failure Statistics within the Data Cloud)

FINANCIAL STRESS RISK CLASS	% OF D&B FILE REPRESENTED	PROJECTED FAILURE RATE WITHIN RISK CLASS	PROJECTED CUMULATIVE % OF FAILURES IDENTIFIED
1	6%	0.04%	99.94%
2	26%	0.12%	99.21%
3	35%	0.33%	96.48%
4	32%	1.37%	86.12%
5	1%	9.50%	0.0%

Each Financial Stress Score Risk Class has a failure rate that can be compared with the national average of financial stress. For example, the table above shows that 9.50% of all companies scoring a 5 in 2007 failed in 2008. What this means is that businesses scoring in the Financial Stress Risk Class of 5 are almost 14 times ($9.5/0.69 = 13.77$) more likely to fail than the national average. Similarly, businesses with a Financial Stress Risk Class of 1 are 17 times ($0.69/0.04 = 17.25$) less likely to fail than the national average.

Table 3 provides the national average failure rates, based on information in the Data Cloud, by major industry group.

Table 3: National Average Failure Rate by Industry
(Based on 2008 Failure Statistics within Dun & Bradstreet's Data Cloud)

MAJOR INDUSTRY GROUP	PROJECTED FAILURE RATE
Agriculture, Forestry, Fishing,	0.24%
Mining	0.31%
Construction	0.68%
Manufacturing	1.05%
Transportation, Communications	0.95%
Wholesale Trade	0.95%
Retail Trade	0.76%
Finance, Insurance, Real Estate	0.47%
Services	0.57%

APPENDIX A

LIST OF DATA ELEMENTS USED IN THE FINANCIAL STRESS SCORING MODEL

Following is a list of some of the data elements used in the Financial Stress Scoring Model:

Demographic/Public Records Information

FACTOR	IMPACT ON MODEL
Company Type	Businesses that are corporations are considered less risky. These businesses typically have the ability to utilize additional support if necessary.
Suits, Liens, Judgments, and Prior Bankruptcies	The presence, as well as the volume and dollar amount, of open suits, liens, or judgments. These are typically unforeseen circumstances that may negatively impact a business. The absence of public filings is considered a positive factor.
Age of the business	How long a business has been operating is a measure of stability. The longer a business has been operating, the lower the risk.
Industry	The industry that a business operates in can have a higher or lower rate of business failure.
Region	Some areas are more profitable and businesses who operate in these regions are less likely to fail.
Debt Rating	National Debt Rating companies provide ratings on businesses that issue bonds. These ratings are used in the calculation process to derive the final FSS scores.
Macro-economic data	Local Macro-economic data is used to ensure changes in the external economic environment are reflected in Dun & Bradstreet's scores

Financial Information

FACTOR	IMPACT ON MODEL
Presence of Financial Statement	If the date of the Balance Sheet or Income Statement is 24 months old or less, financial ratios will be calculated and used in the model
Net Worth	A Negative Net Worth is an indication of higher risk. And, an increase in the dollar amount of Net Worth is an indication of lower risk.
Current Liability	Current liabilities are liabilities of the business that are to be settled in cash within the financial year or the operating cycle.

Payment Information

FACTOR	IMPACT ON MODEL
Percentage of satisfactory Payment Experiences	The higher the number of satisfactory trade experiences that Dun & Bradstreet has reported on an individual business, the lower the risk.
Number of Negative Payment Experiences within defined periods	Negative payments adversely affect the score. They consist of factors such as bad debt, non-sufficient funds, account placed for collection etc. Number and recency of negative payment experiences is an important indicator a businesses having cash flow difficulties.
Most Recent Paydex®	Paydex® is a proprietary Dun & Bradstreet index, summarizing past payment behavior. The higher the Paydex®, the lower the risk.

APPENDIX B

KEY BUSINESS COMMENTARIES

Following are some examples of commentary messages that may appear in the Financial Stress Scoring section of the report. Up to six commentaries will appear in a rank order, based on their prioritization in the model.

KEY BUSINESS COMMENTARIES
Businesses in this industry have a higher risk of failure
This business is well-established
Number of Employees indicates that this business has a higher risk of failure
No Suits, Liens or Judgements have been filed in the last 3 years
Suits, Liens and/or Judgements have been filed in the last 3 years
The majority of trade experiences are paid prompt or within 30 days
The majority of trade experiences are not paid prompt or within 30 days
Some trade experiences are paid prompt or within 30 days
Payment experiences suggest potential lower risk.
Payment information indicates slow payments are present
The majority of trade experiences are paid prompt or within 30 days
There a small number of trade experiences paid prompt in the last 90 days
We do not hold a current financial statement
Total Liabilities indicates lower risk
Equity Ratio indicates lower risk
No information recorded against this business in the past 24 months
Business or Management Record is present for this firm.
Dun & Bradstreet does not calculate the likelihood of this enterprise failing as it is State or Government owned
The business operates in an unclassified industry. The likelihood of failure cannot be determined.

APPENDIX C

SUMMARY PROJECTED PERFORMANCE TABLES

Credit Score Performance Within Range						
RISK CLASS	SCORE RANGE	PERCENTILE RANGE (APPROX)	% OF BUSINESSES (APPROX)	FAILURE RATE	% OF FAILURES IDENTIFIED	GOOD-BAD RATIO
1	1561 - 1890	95 - 100	6%	0.04%	99.94%	2,499
2	1493 - 1890	69 - 100	32%	0.10%	99.21%	972
3	1432 - 1890	34 - 100	67%	0.22%	96.48%	450
4	1294 - 1890	2 - 100	99%	0.60%	86.12%	167
5	1001 - 1890	1 - 100	100%	0.69%	0%	145

Credit Score Performance Within Range				
SCORE RANGE	PERCENTILE RANGE (APPROX)	% WITHIN RANGE (APPROX)	FAILURE RATE	% OF FAILURES IDENTIFIED
1561 - 1890	95 - 100	6%	0.04%	0.06%
1493 - 1560	69 - 94	26%	0.12%	0.74%
1432 - 1492	34 - 68	35%	0.33%	2.73%
1294 - 1431	2 - 33	32%	1.37%	10.36%
1001 - 1293	1 - 1	1%	9.50%	86.12%

EXPLANATIONS

CUMULATIVE FINANCIAL STRESS SCORE PERFORMANCE

- **% of Businesses:** 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 67% of all customers requires accepting businesses scoring at or above 1432 (or 34 - 100 percentile). Businesses scoring below the cutoff score (1001 - 1431) 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 1432 (or 34 - 100 percentile) is expected to be 0.22%.
- **% of Failures Identified:** The percentage of total failed businesses that score between 1,001 and the cutoff point for the approval rate. For example, approving businesses with a score at or above 1432 (or 34 - 100 percentile) is expected to eliminate 96.48% of the “bad” businesses.
- **Good-Bad Ratio (Odds):** The ratio of “Good” businesses to “Bad” businesses 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 businesses scoring at or above 1432 (or 34 - 100 percentile) should result in a portfolio with 450 “Good” businesses for every “Bad” business in the portfolio.

FINANCIAL STRESS SCORE PERFORMANCE WITHIN RANGE:

- **Failure Rate within Range:** The failure rate for those businesses that score within the score range. For example, the failure rate for businesses scoring between 1294 and 1431 (or 2 - 33 percentile) is expected to be 1.37%.
- **% Of Failures Identified:** The percentage of total failed businesses within the score range. For example, 10.36% of failed businesses are expected to score between 1294 and 1431 (or 2 - 33 percentile)

DETAILED PROJECTED PERFORMANCE TABLES

Cumulative Financial Stress Score Performance					
SCORE RANGE	PERCENTILE RANGE (APPROX)	% OF BUSINESSES (APPROX)	FAILURE RATE	% OF FAILURES IDENTIFIED	GOOD-BAD RATIO
1566 - 1890	96 - 100	5%	0.04%	99.95%	2687
1544 - 1890	91 - 100	10%	0.05%	99.88%	1976
1531 - 1890	86 - 100	15%	0.06%	99.78%	1586
1519 - 1890	81 - 100	20%	0.07%	99.65%	1364
1508 - 1890	76 - 100	25%	0.09%	99.49%	1166
1497 - 1890	71 - 100	30%	0.10%	99.30%	1028
1489 - 1890	66 - 100	35%	0.11%	99.08%	905
1482 - 1890	61 - 100	39%	0.12%	98.83%	816
1471 - 1890	56 - 100	45%	0.14%	98.53%	727
1463 - 1890	51 - 100	49%	0.15%	98.19%	663
1452 - 1890	46 - 100	55%	0.17%	97.79%	582
1443 - 1890	41 - 100	60%	0.19%	97.31%	522
1436 - 1890	36 - 100	65%	0.21%	96.75%	469
1426 - 1890	31 - 100	70%	0.24%	96.10%	422
1415 - 1890	26 - 100	75%	0.26%	95.32%	378
1403 - 1890	21 - 100	80%	0.30%	94.38%	336
1392 - 1890	16 - 100	84%	0.33%	93.23%	298
1372 - 1890	11 - 100	90%	0.39%	91.78%	256
1343 - 1890	6 - 100	95%	0.47%	89.57%	212
1001 - 1890	1 - 100	100%	0.69%	0.00%	145

Financial Stress Score Performance Within Range

SCORE RANGE	PERCENTILE RANGE (APPROX)	FAILURE RATE	% OF FAILURES IDENTIFIED
1566 - 1890	96 - 100	0.04%	0.05%
1544 - 1565	91 - 95	0.06%	0.07%
1531 - 1543	86 - 90	0.09%	0.11%
1519 - 1530	81 - 85	0.11%	0.13%
1508 - 1518	76 - 80	0.13%	0.15%
1497 - 1507	71 - 75	0.16%	0.19%
1489 - 1496	66 - 70	0.19%	0.22%
1482 - 1488	61 - 65	0.21%	0.25%
1471 - 1481	56 - 60	0.25%	0.30%
1463 - 1470	51 - 55	0.29%	0.34%
1452 - 1462	46 - 50	0.34%	0.40%
1443 - 1451	41 - 45	0.41%	0.48%
1436 - 1442	36 - 40	0.47%	0.56%
1426 - 1435	31 - 35	0.55%	0.65%
1415 - 1425	26 - 30	0.66%	0.78%
1403 - 1414	21 - 25	0.80%	0.95%
1392 - 1402	16 - 20	0.97%	1.15%
1372 - 1391	11 - 15	1.23%	1.45%
1343 - 1371	6 - 10	1.87%	2.21%
1001 - 1342	1 - 5	4.73%	89.57%

EXPLANATIONS

CUMULATIVE FINANCIAL STRESS SCORE PERFORMANCE

- **Approval Rate:** To use, 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 that approves 70% of all businesses requires accepting businesses between 1426 - 1890 (or 31 - 100 percentile). Businesses scoring below the cutoff (1001 - 1425) are reviewed, declined, etc.
- **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 1426 (or 31 - 100 percentile) is expected to be 0.24%.
- **% of Failures 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 1426 (31 - 100 percentile) is expected to eliminate 96.10% of the “bad” businesses.
- **Good-Bad Ratio (Odds):** The ratio of “Good” businesses to “Bad” businesses 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 businesses scoring at or above 1426 (or 31 - 100 percentile) should result in a portfolio with 422 “Good” businesses for every “Bad” business in the portfolio.

FINANCIAL STRESS SCORE PERFORMANCE WITHIN RANGE

- **Failure Rate:** The incidence of failure for those businesses that score within the score range. For example, the failure rate for companies scoring between 1415 and 1425 (or 26 - 30 percentile) is expected to be 0.66%.
- **% of Failures Identified:** The percentage of total failed businesses within the score range. For example, 0.78% of all failed companies are expected to score between 1415 and 1425 (or 26 - 30 percentile).



ABOUT DUN & BRADSTREET

Dun & Bradstreet, a leading global provider of business decisioning data and analytics, enables companies around the world to improve their business performance. Dun & Bradstreet's Data Cloud fuels solutions and delivers insights that empower customers to accelerate revenue, lower cost, mitigate risk, and transform their businesses. Since 1841, companies of every size have relied on Dun & Bradstreet to help them manage risk and reveal opportunity. Twitter: [@DunBradstreet](#)