

Understanding the D&B US 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?



I. INTRODUCTION

The D&B U.S. Financial Stress Score (FSS) 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 operation 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 information in the Dun & Bradstreet Data Cloud.

The Financial Stress Scoring System uses statistical probabilities to classify public and private companies into three risk classifications of Financial Stress: a 1,001-1,875 Score; a 1-100 Percentile Ranking, and a 1-5 Risk Class segmentation. These classifications are based on the chance of a business experiencing the above definition of “bad” performance over the next 12 month period. The Financial Stress Scoring models utilize the combined power of the Dun & Bradstreet Data Cloud with approximately 27 million active U.S. businesses including payment, public filing, demographic, and financial information when available.

The integrity of the information contained in our 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 our vast Data Cloud into actionable business insight, enabling you to more confidently make critical risk decisions.

The U.S. Financial Stress Score is a suite of scorecards – a modeling 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 U.S. Financial Stress Scoring System was developed.

II. U.S. FINANCIAL STRESS SCORE

What the 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 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.

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” of 1,001 – 1,875, where a 1,001 represents businesses that have the highest probability of financial stress, and a 1,875 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 business 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.

3. A “Risk 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. This 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 the Dun & Bradstreet Data Cloud. 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

FINANCIAL STRESS RISK CLASS	% OF BUSINESSES WITHIN THIS FINANCIAL STRESS RISK CLASS	FINANCIAL STRESS PERCENTILE	FINANCIAL STRESS SCORE
1	6%	95-100	1570-1875
2	26%	69-94	1510-1569
3	35%	34-68	1450-1509
4	32%	2-33	1340-1449
5	1%	1	1001-1339

Availability of the Financial Stress Score

A Financial Stress Score is available on approximately 27 million U.S.-based businesses. Financial Stress Scores are not available on business files that fall into the following categories:

- FSS will automatically trade-up to the headquarter location score on business branch locations.
- FSS will not be available (blank) on:
 - Business records that are missing an address or have an invalid address.
 - Businesses that have been self-reported to Dun & Bradstreet without an investigation. Such cases are added to the Data Cloud as D-U-N-S Number Support records and will remain as such until a thorough investigation yields more substantial information.

- Businesses designated as “Business Deterioration”¹ within one year. These companies continue to operate and have not filed for bankruptcy.
- Businesses in industries that do not lend themselves to scoring through this type of model – specifically, SIC Code 43 (United States Postal Service) and SIC Codes 90-97 (Public Administration, Government Offices).
- FSS will automatically be assigned a score of zero (0) on:
 - Businesses designated as “Discontinued at This Location,” “Open Bankruptcy”, or “Higher Risk”².

Model Development Process

The models built for the U.S. Financial Stress Score leverage the Dun & Bradstreet’s extensive 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 weight the data elements that are most predictive of business failure. The resulting Financial Stress Score models are mathematical equations that consist of a series of variables and coefficients (weights) that have been calculated for each variable.

Model development involves selecting data available at the time of observation that will indicate how the business is expected to perform over a certain period of time. For the Financial Stress Score, we selected a weighted sample of ‘credit active’ businesses. Dun & Bradstreet defines a ‘credit active’ business as one with 1+ credit inquiry to Dun & Bradstreet in the last 12 months.

1. The “Business Deterioration” designates a business showing signs of financial distress, such as existing or imminent business failure or operating difficulty as reviewed and confirmed by Dun & Bradstreet analysts.

2. These “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.

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 Financial Stress Score Version 7.1, the observation window was January 2007 and the performance window was the twelve months from February 2007 to January 2008. A total of 937,038 businesses were used in model development. Of this population, 932,555 were considered “good”, or non-financially stressed companies in the the Dun & Bradstreet Data Cloud and 4,483 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. Only Dun & Bradstreet, with its access to a vast Data Cloud with approximately 27 million quality U.S. business records, is uniquely qualified to demonstrate this impact. Dun & Bradstreet identified hundreds of predictive variables from evaluating a combination of both “good” and “bad” performing businesses in the Dun & Bradstreet Data Cloud. Appendix A contains a sampling of data elements.

Scoring System and Model Selection

Risk varies greatly with size of a business, so Dun & Bradstreet developed a scoring system that accounts for the correlation between business size and risk exposure. The result is a suite of models consisting of multiple unique scorecards. This segmented solution is driven by employee size. Each model was developed and optimized on a more homogenous subpopulation to account for both the size of the subject business as well as the amount of information contained in our Data Cloud on the business.

Having a system of models allows for better separation of “goods” and “bads” by focusing on unique populations. It also provides for our most predictive

score possible, optimized on the data available. D&B’s Financial Stress Score, therefore, provides maximum risk discriminatory power with segmented scorecards for improved risk management decisions.



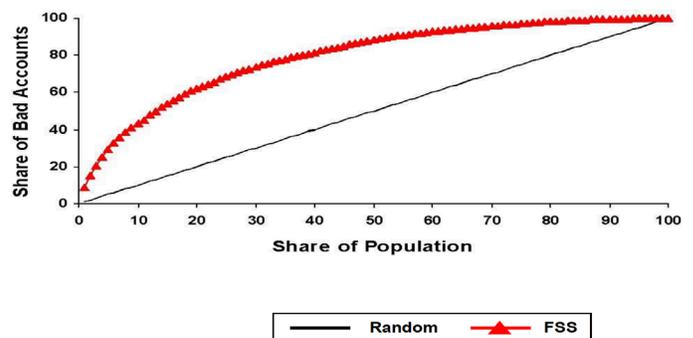
Business size is a critical factor in decisioning. However, in some instances, this information is not present on particular business records. In those cases, we have developed a separate modeling algorithm that optimizes the available information to predict financial stress on these “thin” records.

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 59% 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 59% of the “bads” in that group.

Graph 1: Financial Stress Score Performance across All Size Segments



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, models are robust tools for rank-ordering risk in changing circumstances; higher scoring businesses 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.

Relationship between Financial Stress Score and Projected Failure Rates

The national average failure rate, based on 2008 failure statistics within the Dun & Bradstreet Data Cloud, is 0.48%.

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 Dun & Bradstreet’s Data Cloud)

FINANCIAL STRESS RISK CLASS	% OF D&B FILE REPRESENTED	PROJECTED FAILURE RATE WITHIN RISK CLASS	PROJECTED CUMULATIVE % OF FAILURES IDENTIFIED
1	6%	0.03%	99.58%
2	26%	0.09%	94.07%
3	35%	0.24%	74.07%
4	32%	0.84%	11.06%
5	1%	4.70%	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 4.70% 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 10 times ($4.7/0.48 = 9.79$) more likely to fail than the national average. Similarly, businesses with a Financial Stress Risk Class of 1 are 16 times ($0.48/0.03 = 16$) less likely to fail than the national average.

Table 3 provides the national average failure rates, based on information in the Dun & Bradstreet 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	0.30%
Mining	1.20%
Construction	0.51%
Manufacturing	0.51%
Transportation, Communications	0.55%
Wholesale Trade	0.45%
Retail Trade	0.52%
Finance, Insurance, Real Estate	0.36%
Services	0.42%

Appendix A

List of the 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.
Condition Indicator	The financial condition of a business determines its ability to pay trade obligations. A "STRONG" financial condition positively impacts the score; a condition that is "UNBALANCED" is considered negative.
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.
Total Number of Employees	In general, the larger the number of employees, the greater the stability of the business, and hence the lower the risk.
Total Number of UCC Filings	The presence and volume of UCC filings adversely impact the score.
Age of the business	How long a business has been operating is a measure of stability. The more years the business has been operating, the lower the risk.

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
Current Ratio	Current ratio demonstrates the working capital relationship of current assets to cover current liabilities. The greater the current ratio, the lower the risk.
Net Profit and Net Profit Margin	Generally, the greater the net profit after taxes, the lower the likelihood of risk.
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.
Return on Sales	Generally, the greater the return on sales, the lower the likelihood of risk.
Debt to Income	The lower the debt to income ratio, the lower the likelihood of risk.
National Debt Ratings	Debt Ratings are based on an examination of financial statement ratios, management quality, and other intangibles learned. National Debt Ratings classified as "safe investments" are lower risk than those classified as "speculative" or "junk".
Current, Long Term, and Total Liabilities to Net Worth Ratios	Generally, the lower the business's Liabilities to Net Worth Ratio, the lower its overall likelihood of risk.

Payment Information

FACTOR	IMPACT ON MODEL
Number of Payment Experiences	The higher the number of trade experiences that Dun & Bradstreet has reported on an individual business, the lower the likelihood of risk. With the absence of trade information, the model will rely upon other demographic and financial data available on a business.
Percent Satisfactory Payment Experiences	The higher the percentage of satisfactory payment experiences, the lower the risk. These payments consist of trade obligation behavior such as "anticipate, discount, and prompt."
Percent of Payment Experiences 61-90 Days Past Due	The higher the percentage of payment experiences of the business that fall within the 61-90 days past due category, the higher the risk.
Percent of Payment Dollars 91 or More Days Past Due	The higher the percentage of payment dollars of the business that fall within the 91 or more days past due category, 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.
Most Recent Paydex	The higher the Paydex, the lower the risk.
Variance of Paydex	The more volatility in Paydex, the higher 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.

1. Limited time in business
2. Limited time under present management control
3. Evidence of open suits, liens, and judgments
4. Evidence of open suits and judgments
5. Evidence of open suits and liens
6. Evidence of open liens and judgments
7. Evidence of open suits
8. Evidence of open liens
9. Evidence of open judgments
10. Prior bankruptcy
11. Prior business deterioration
12. UCC filings reported
13. Business does not own facilities
14. High number of inquiries to Dun & Bradstreet over last 12 months
15. Higher risk legal structure
16. Higher risk industry based on failure rates by industry
17. Higher risk state based on failure rates by state
18. Financial condition is rated unbalanced
19. Negative net worth
20. Negative change in net worth
21. Limited number of comparative financial statements
22. Composite credit appraisal is rated fair
23. Composite credit appraisal is rated limited
24. Financial ratios indicate higher risk
25. Higher risk rating assigned by National Debt Rating Agency
26. No payment experiences
27. Insufficient number of payment experiences
28. Low proportion of satisfactory payment experiences to total payment experiences
29. High proportion of slow payment experiences to total number of payment experiences
30. High proportion of past due balances to total amount owing
31. Low Paydex score
32. Unstable Paydex over last 12 months
33. Special Event in the Dun & Bradstreet Report

Appendix C

The following Summary and Detailed Projected Performance Tables are based on a representative sample and actual performance may vary based on individual customer portfolios.

Summary Projected Performance Table

CUMULATIVE FINANCIAL STRESS SCORE PERFORMANCE						FINANCIAL STRESS SCORE PERFORMANCE WITHIN RANGE			
SCORE RANGE	PERCENTILE RANGE (APPROX)	% OF BUSINESSES	FAILURE RATE	% OF FAILURES IDENTIFIED	GOOD-BAD RATIO	SCORE RANGE	PERCENTILE RANGE (APPROX)	FAILURE RATE	% OF FAILURES IDENTIFIED
1574-1875	96-100	5%	0.03%	99.66%	3204	1574-1875	96-100	0.03%	0.34%
1555-1875	91-100	10%	0.04%	98.99%	2264	1555-1573	91-95	0.06%	0.67%
1542-1875	86-100	15%	0.05%	98.20%	1860	1542-1554	86-90	0.07%	0.79%
1534-1875	81-100	20%	0.06%	97.31%	1628	1534-1541	81-85	0.08%	0.90%
1522-1875	76-100	25%	0.07%	96.18%	1444	1522-1533	76-80	0.10%	1.12%
1514-1875	71-100	30%	0.08%	94.84%	1287	1514-1521	71-75	0.12%	1.35%
1505-1875	66-100	35%	0.09%	93.27%	1154	1505-1513	66-70	0.14%	1.57%
1496-1875	61-100	40%	0.10%	91.47%	1029	1496-1504	61-65	0.16%	1.80%
1487-1875	56-100	45%	0.11%	89.34%	921	1487-1495	56-60	0.19%	2.13%
1478-1875	51-100	50%	0.12%	86.76%	828	1478-1486	51-55	0.23%	2.58%
1472-1875	46-100	55%	0.13%	83.84%	768	1472-1477	46-50	0.26%	2.92%
1464-1875	41-100	60%	0.15%	80.70%	686	1464-1471	41-45	0.28%	3.14%
1452-1875	36-100	65%	0.16%	76.88%	619	1452-1463	36-40	0.34%	3.82%
1440-1875	31-100	70%	0.18%	72.28%	556	1440-1451	31-35	0.41%	4.60%
1425-1875	26-100	75%	0.20%	66.44%	494	1425-1439	26-30	0.52%	5.84%
1417-1875	21-100	80%	0.22%	59.37%	451	1417-1424	21-25	0.63%	7.07%
1409-1875	16-100	85%	0.25%	51.29%	400	1409-1416	16-20	0.72%	8.08%
1403-1875	11-100	90%	0.29%	42.09%	338	1403-1408	11-15	0.82%	9.20%
1386-1875	6-100	95%	0.33%	30.53%	300	1386-1402	6-10	1.03%	11.56%
1001-1875	1-100	100%	0.48%	0.00%	209	1001-1385	1-5	2.72%	30.53%

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 1875 (or 100 percentile). For example, a credit policy that approves 70% of all businesses requires accepting businesses between 1440-1875 (or 31-100 percentile). Businesses scoring below the cutoff (1001-1439) are reviewed, declined, etc.

- **Failure Rate:** Represents those businesses that score between the lowest value in the score range and 1875. For example, the failure rate for a credit policy which approves all businesses with a score at or above 1440 (or 31-100 percentile) is expected to be 0.18%.
- **% 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 1440 (31-100 percentile) is expected to eliminate 72.28% of the “bad” businesses.
- **Cumulative 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 1875 (or 100 percentile). For example, a credit policy which approves all businesses scoring at or above 1440 (or 31-100 percentile) should result in a portfolio with 556 “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 1425 and 1439 (or 26-30 percentile) is expected to be 0.52%.
- **% of Failures Identified:** The percentage of total failed businesses within the score range. For example, 5.84% of all failed companies are expected to score between 1425 and 1439 (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](#)