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Understanding the Belgium & Luxembourg D&B Failure Score

THIS DOCUMENT IS INTENDED TO ADDRESS THE FOLLOWING QUESTIONS:

- What is the D&B Failure Score?
- What does the D&B Failure Score predict?
- What is the availability of the D&B Failure Score?
- How is the D&B Failure Score calculated?
- How does the D&B Failure Score perform?
- What is the Relationship between the D&B Failure Score and Failure Rates?

INTRODUCTION

The Belgium and Luxembourg D&B Failure Score, also known in some markets as the D&B Financial Stress Score (FSS), predicts the likelihood that a business will seek legal relief from its creditors or cease business operations without paying all its creditors in full in the next 12 months, based on the full range of data that Dun & Bradstreet has available on a business.

To evaluate risks objectively and consistently, Dun & Bradstreet combines a large amount of business information with expert analysis and statistical techniques to determine the risk associated with a business.

The integrity of the information contained in the Dun & Bradstreet Data Cloud is driven by our proprietary DUNSRight™ Quality Process. DUNSRight™ is our process for turning an enormous stream of data into high quality business information.

The Belgium and Luxembourg D&B Failure Score is highly effective in helping to predict the potential solvency of your existing and prospective customers. The solution allows you to:

- Automate decisions for increased efficiency
- Process large volumes of transactions more quickly
- 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 Belgium and Luxembourg Failure Scoring System was developed.

BELGIUM AND LUXEMBOURG D&B FAILURE SCORE

WHAT THE D&B FAILURE SCORE PREDICTS

The D&B Failure Score predicts the likelihood that a business will seek legal relief from its creditors or cease operations leaving unpaid debts in the next 12 months.

Dun & Bradstreet defines a business which seeks legal relief from its creditors or ceases operations without paying all its creditors in full as a Failed Business. The D&B Failure Score predicts the likelihood such Failure.

The legal events which used in the definition of failure in Belgium and Luxembourg are:

- Bankruptcy
- Business Failure
- Failure on Own Petition
- Legal Settlement Request
- Legal Settlement Court Acceptances
- Legal Settlement Resolutions Agreed
- Legal Settlement Court Annulments
- Failure on Creditors Petitions
- Failure on Court Rulings
- Failure Annulments by Courts
- Release from Failure
- Request for Release from Failure
- Legal Settlement Request rejected by Court
- Dissolutions by Court
- Re-opening of Failure
- Judgment to Close all Failure procedures

Cases which are not out of business and have experienced one or more of the above events will receive a score of 1001, Percentile Ranking of 1 and a Risk Indicator of 4.

Cases which are out of business will not have a score, the field will be blank.

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

AVAILABILITY OF THE FAILURE SCORE

The D&B Failure Score is available on the active universe in both Belgium and Luxembourg. In December 2013, the active universe in Belgium was 1,339,131 businesses and in Luxembourg was 123,180 businesses.

The following are not considered for scoring and are outside of the Scoreable Universe:

- Businesses which are Out of Business
- Foreign Registered Businesses
- Temporary Associations (identified by a legal form)

The D&B Failure Score will not be calculated for branches. Automatic trade-up to the headquarter location score will take place for branch locations.

To ensure that our scores are based on good information, Dun & Bradstreet has put in place a minimum level of data requirement. Only records that satisfy this minimum requirement will be scored. The list of minimum requirements for Belgium is:

- Registered or primary Business address
- Registered or primary Business name
- Legal form must not be NULL
- Any one of the below predictive indicators
  - A SIC-8 (except in the range 99990000 to 99999999
  - Number of employees (must not be <NULL>)
  - A current PAYDEX® Score (must not be <NULL>)
  - A current Number Of Trade Suppliers (must not be <NULL>)
  - A Start Date Indicator (must not be <NULL>)
  - Post code (region) (must not be <NULL>)
  - Months at current address (must not be <NULL>)

Cases which do not meet this criteria are considered as part of the scoreable universe, however will have a Raw Score of blank (null), Percentile Ranking of blank (null) and the risk indicator will be null or 'dash'.

Some conditions do not lend themselves to treatment with a statistical tool or are too severe to be dealt with by a statistical tool alone. Examples may include parent company in financial distress, special rare legal events or natural disasters. In these special cases additional business rules may be applied in addition to the score calculation. The business rules generated in Belgium and Luxembourg are listed below.

- Cases with Non Corporate VAT Number deleted will have Raw Score of blank (null), Percentile Ranking of blank (null) and the risk indicator will be null or 'dash'.
- Cases with parent company which is high risk will be assigned a Raw Score of 1001, a Percentile Ranking of 1 and a Risk Indicator of 4. This rule applies for the following circumstances:
  - Parent in Belgium or Luxembourg with a Risk Indicator of 4
  - Parent in Belgium or Luxembourg is Out of Business
- For Luxembourg based businesses we collect financial data pro-actively on 15,000 records therefore the 'Required to File' rules are not applied in the scoring process. This means there is no reduction to the score if Financials are not present for Luxembourg based businesses.

SCORE DEVELOPMENT PROCESS

The Failure Scorecards were developed using rigorous statistical techniques for all stages of the modeling process. This ensures that the resulting model is stable and robust. Our process of checks and balances also includes validation of the models on separate samples from different time periods to ensure stability over time.

In the scorecard development process, data is extracted from two time periods designated as an observation point and a performance window. The observation point defines the sample used in the model and all identification and characteristic data are collected from the time period directly prior to that point. The predictive variables and segmentation are defined from this snapshot. The performance window defines the length of time the businesses in the sample are tracked to examine their behavior.

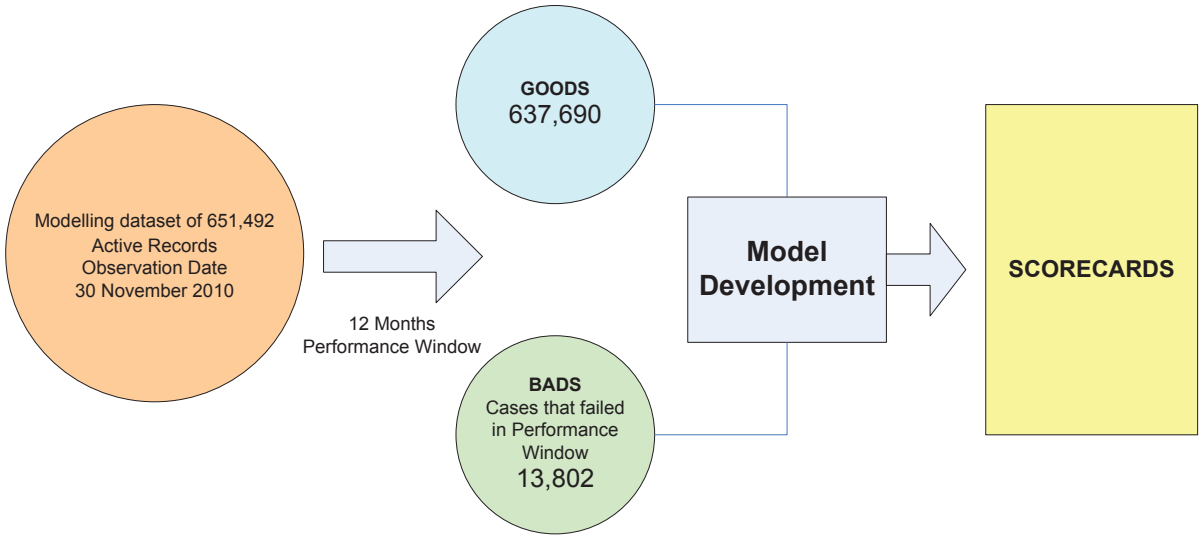
In the development of the Belgium and Luxembourg D&B Failure Score, data from both countries was pulled together to form one data sample. The observation window was 30 November 2010 and the performance window was the twelve months from 1 December 2010 to 30 November 2011. A total of 651,492 businesses were used in model development. Of this population, 637,690 were considered "good", or non-financially stressed companies in the Dun & Bradstreet Data Cloud and 13,802 were considered "bad", or financially stressed companies in the Data Cloud.

Sample data elements used in the model include:

- Demographic information such as industry, corporate structure
- Financial information
- Dun & Bradstreet proprietary payment behavior information
- Legal events such as collections, liens and judgments

Appendix A contains a more comprehensive list of data elements which are used in calculating the score.

The following diagram shows the scorecard development steps:



Dun & Bradstreet's statistical model development process includes the following steps:

- Segmentation analysis for optimal representation of risk behavior of various sub-populations of the scoreable universe.
- Selection of optimal attributes (predictors) for each segment The attributes selected by the statistical tool are also verified by the business experts to ensure suitability in the local market conditions
- Optimal binning techniques to leverage data patterns observed in partition of the predictors
- Scoring algorithm calculation selected by the modeling technique used.

To ensure the model's robustness and stability of predictors a test and validation approach for model estimation is used.

To ensure stability of the model over time, an additional validation is performed on samples from new time windows as well as on selected large customer portfolios.

The Scorecards were validated on an observation window at 31st March 2012 and a performance window of the twelve months from 1st April 2012 to 31st March 2013. A total of 725,325 businesses were used in the validation. Of this population, 711,224 were considered "good" or non-financially stressed companies and 14,100 were considered "bad", or financially stressed companies in the Dun & Bradstreet Data Cloud. The tables in this document are calculated on the validation data.

The scoring algorithm formula calculates the probability of business failure. This predicted probability is then converted to a score using a scorecard which assigns points to each selected level of each predictor.

SCORING OUTPUTS – SCORE VALUES

The Failure Score assigns the following measurements of risk:

1. **A "Score" of 1001 – 1836** is the initial output (sum of assigned points) where 1001 represents businesses that have the highest probability of failure, and 1836 which represents businesses with the lowest probability of failure. 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 1200, on a marginal basis, represents twice the risk of Failure as a score of 1240. This score enables a customer to use more granular cutoffs to drive their automated decision-making process.

2. **A Percentile Ranking of 1 – 100,** where 1 represents businesses that have the highest probability of failure and 100 which represents businesses with the lowest probability of failure. This Score Ranking shows you where a business falls among businesses in the 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 Indicator" of 1 – 4** which is a segmentation of the scorable universe into four distinct risk groups where a one (1) represents businesses that have the lowest probability of failure , and four(4) represents businesses with the highest probability of failure . This Risk Indicator enables a customer to quickly segment their new and existing accounts into various risk groups for high-level analysis and reporting.

The following table shows the mappings and distribution of the Risk Indicator for Belgium & Luxembourg

RISK INDICATOR	% OF BUSINESSES WITHIN THIS RISK INDICATOR	FAILURE PERCENTILE SCORE	FAILURE RAW SCORE
1	12%	89 -100	1501 - 1836
2	38%	51 - 88	1408 - 1500
3	35%	16 - 50	1339 - 1407
4	15%	1 - 15	1001 - 1338

SCORECARD PERFORMANCE

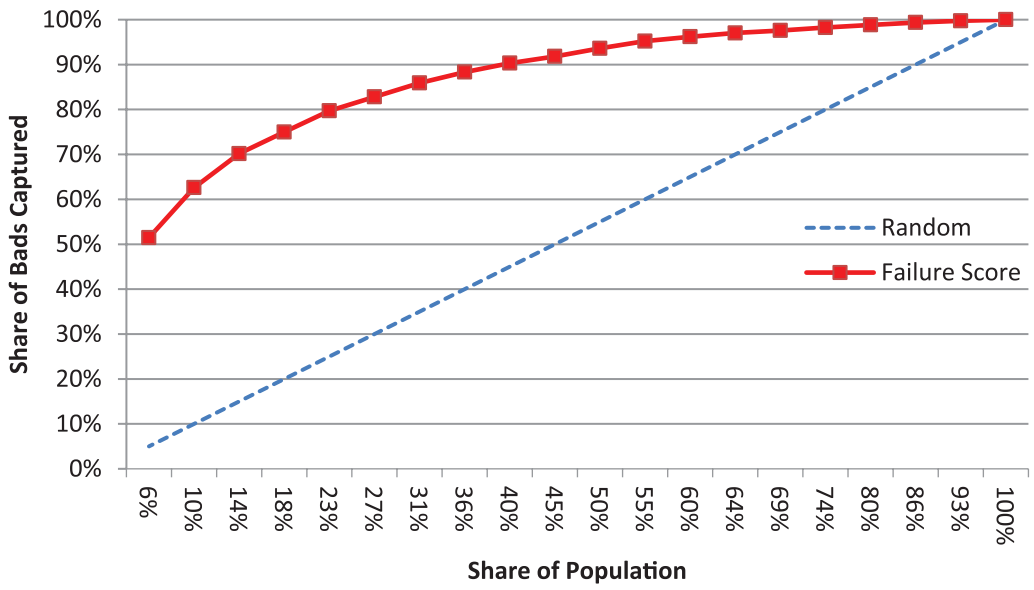
Dun &Bradstreet applies stringent rules to model performance to ensure that our scores meet the best in class performance standards. Measurements of model performance include an assessment of risk ranking, robustness and discriminate power. Metrics used are:

- Ranking accuracy by model, decile or quintile
- Close match between predicted and actual bad rates
- The Kolmogorov-Smirnoff (K-S) statistic distance between cumulated distribution of good and bad cases as rank ordered by the model
- Predictive Index (Gini Index) assessment of model gains compared to a perforce classifier
- The lift Gain chart with emphasis on showing the improvement in capturing Bads at the 10th and 20th scores

One of the typical ways to measure model effectiveness 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 Failure Score by identifying the failure captured within population groups. For example, at approximately 20% of the population, the Failure Score scores identified approximately 75% of the "bads".

Graph 1: Failure Score Performance across All Size Segments



Scorecards 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.

SCORE PERFORMANCE MONITORING

Dun & Bradstreet is committed to delivering the highest quality scores to our Customers. Regular performance monitoring of the scorecards assures continual performance of the scores in identifying risk. Scores that lose their predictive power are scheduled for redevelopment or recalibration.

RELATIONSHIP BETWEEN THE D&B FAILURE SCORE AND PROJECTED FAILURE RATES

The national average failure rate, based on 01-Apr-2012 to 31-Mar-2013 failure statistics within the Data Cloud, is 1.94%.

Table 2: National Average Failure Rate by Risk Indicator (Based on 2008 Failure Statistics within the Dun & Bradstreet Data Cloud)

RISK INDICATOR	% OF DUN & BRADSTREET FILE REPRESENTED	PROJECTED FAILURE RATE WITHIN RISK INDICATOR	PROJECTED CUMULATIVE % OF FAILURES ELIMINATED
1	12%	0.09%	99.25%
2	38%	0.37%	91.82%
3	35%	1.37%	70.17%
4	15%	9.71%	0.00%

Each Failure Risk Indicator has a failure rate that can be compared with the national average of Failure. For example, the table above shows that 9.71% of all businesses with Risk Indicator of 4 in March 2012 failed between April 2012 – March 2013 What this means is that businesses scoring in the Failure Risk Class of 4 are approximately 5 times more likely to fail than the national average.

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

Table 3: National Average Failure Rate by Industry

MAJOR INDUSTRY GROUP	PROJECTED FAILURE RATE
Agriculture	0.62%
Banks, Credit & Brokers	0.86%
Business Services	1.70%
Communication	4.15%
Consumer Manufacturing	2.16%
Eating & Drinking places	6.22%
Electrical equip/instruments	1.55%
Engineer Manage Service	0.74%
Food Stores	3.68%
General Building Contractors	2.63%
Government	0.24%
Health/Education/Social/Mship	0.13%
Heavy Construction Contractors	2.11%
Holding Investment Offices	0.84%
Hotel, Rooming House, Camp	1.22%
Insurance	0.58%
Investments & Trusts	0.68%
Legal Services	0.14%
Machinery Manufacturing	1.66%
Materials Processing	1.66%
Mining	0.85%
Miscellaneous Services	1.75%
Missing	1.47%
Personal Services	2.07%
Personnel Supply Service	2.93%
Postal Service	0.00%
Real Estate	0.65%
Retail Trade	2.62%
Special Trade contractors	2.94%
Transport	3.34%
Utilities	1.76%
Wholesale Trade	2.24%

APPENDIX A

LIST OF DATA ELEMENTS USED IN THE FAILURE SCORING MODEL

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

Demographic

FACTOR
Industry
Directors' information
Time at Location
Age of Business
Parent Tangible Net Worth
Number of Employees
Legal Form

Financial Information

FACTOR
Months since last Financial Statement
Cash in Bank, Cash in Hand
Return on Assets
Current Liabilities to Net Worth
Net Worth
Gross Profit Trend

Payment Information

FACTOR
Percentage of invoices paid promptly in past 12 months
Paydex®
Average Current Overdue Balance

Public Records Information

FACTOR
How recent is the last Summons
Social Security Summons
Protested Bills
Bankruptcy

APPENDIX B

The following Summary and Detailed Projected Performance Tables are based on the Country database. Actual performance for a customer portfolio may vary based on the account selection within that portfolio.

SUMMARY PROJECTED PERFORMANCE TABLES

Cumulative Failure Score Performance						
RISK INDICATOR	SCORE RANGE	PERCENTILE RANGE	% OF BUSINESSES	FAILURE RATE	% OF FAILURES ELIMINATED	GOOD-BAD RATIO
1	1501 - 1836	89 - 100	12%	0.09%	99.25%	1122
2	1408 - 1836	51 - 100	50%	0.29%	91.82%	346
3	1339 - 1836	16 - 100	85%	0.67%	70.17%	147
4	1001 - 1836	1 - 100	100%	1.94%	0.00%	50

Failure Score Performance Within Range				
SCORE RANGE	PERCENTILE RANGE	% WITHIN RANGE	FAILURE RATE	% OF FAILURES IDENTIFIED
1501 - 1836	89 - 100	12%	0.09%	0.75%
1408 - 1500	51 - 88	38%	0.37%	7.44%
1339 - 1407	16 - 50	35%	1.37%	21.65%
1001 - 1338	1 - 15	15%	9.71%	70.17%

EXPLANATIONS

CUMULATIVE FAILURE SCORE PERFORMANCE:

- **% of Businesses:** To set an approval rate, select the appropriate score range that yields the desired approval rate. For example, to develop a credit policy that approves a projected 85% of all customers requires accepting businesses scoring at or above 1339 (or 16 - 100 score). Businesses scoring below the cutoff score 1339 score are reviewed, declined, etc.

- **Failure Rate:** The failure rate represents those businesses that score between the lowest value in the score range 1339(or 16 percentile ranking) and 1836 (or 100 score). For example, the failure rate for a credit policy which approves all businesses with a score at or above 1339 (or 16 - 100 score) is expected to be 0.67%.

- **% of Failures Eliminated:** 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 1339 (or 16 - 100 score) is expected to eliminate 70.17% 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 1836 (or 100 score). For example, a credit policy that approves all businesses scoring at or above 1339 (or 16 - 100 score) should result in a portfolio with 147 "Good" businesses for every "Bad" business in the portfolio.

FAILURE 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 1001 - 1338 (or 1 - 15 score) is expected to be 9.71%.

- **% Of Failures Identified:** The percentage of total failed businesses within the score range. For example, 70.17% of failed businesses are expected to score between 1001 - 1338 (or 1 - 15 score).

DETAILED PROJECTED PERFORMANCE TABLE

Cumulative Failure Score Performance						Failure Score Performance Within Range			
SCORE RANGE	PERCENTILE RANGE	% OF BUSINESSES	FAILURE RATE	% OF FAILURES ELIMINATED	GOOD-BAD RATIO	SCORE RANGE	PERCENTILE RANGE	FAILURE RATE	% OF FAILURES IDENTIFIED
1548 - 1836	96 - 100	7%	0.07%	99.74%	1365	1548 - 1836	96 - 100	0.07%	0.26%
1512 - 1836	91 - 100	14%	0.09%	99.36%	1089	1512 - 1547	91 - 95	0.11%	0.38%
1487 - 1836	86 - 100	20%	0.11%	98.83%	892	1487 - 1511	86 - 90	0.15%	0.53%
1469 - 1836	81 - 100	26%	0.13%	98.25%	770	1469 - 1486	81 - 85	0.19%	0.58%
1456 - 1836	76 - 100	31%	0.15%	97.59%	669	1456 - 1468	76 - 80	0.25%	0.67%
1448 - 1836	71 - 100	36%	0.16%	97.03%	617	1448 - 1455	71 - 75	0.26%	0.55%
1439 - 1836	66 - 100	40%	0.18%	96.20%	543	1439 - 1447	66 - 70	0.35%	0.83%
1430 - 1836	61 - 100	45%	0.21%	95.21%	482	1430 - 1438	61 - 65	0.40%	0.99%
1419 - 1836	56 - 100	50%	0.25%	93.61%	402	1419 - 1429	56 - 60	0.62%	1.60%
1408 - 1836	51 - 100	55%	0.29%	91.82%	346	1408 - 1418	51 - 55	0.67%	1.80%
1399 - 1836	46 - 100	60%	0.32%	90.31%	316	1399 - 1407	46 - 50	0.64%	1.51%
1390 - 1836	41 - 100	64%	0.35%	88.32%	281	1390 - 1398	41 - 45	0.89%	1.99%
1381 - 1836	36 - 100	69%	0.40%	85.90%	250	1381 - 1389	36 - 40	1.00%	2.42%
1372 - 1836	31 - 100	73%	0.46%	82.80%	217	1372 - 1380	31 - 35	1.43%	3.10%
1362 - 1836	26 - 100	77%	0.51%	79.70%	195	1362 - 1371	26 - 30	1.38%	3.09%
1351-1836	21 - 100	82%	0.59%	74.99%	168	1351 - 1361	21 - 25	1.96%	4.71%
1339 - 1836	16 - 100	86%	0.67%	70.17%	147	1339 - 1350	16 - 20	2.44%	4.82%
1321 - 1836	11 - 100	90%	0.81%	62.61%	123	1321 - 1338	11 - 15	3.49%	7.56%
1293 - 1836	6 - 100	94%	1.00%	51.46%	99	1293 - 1320	6 - 10	5.10%	11.15%
1001 - 1836	1 - 100	100%	1.94%	0.00%	50	1001 - 1292	1 - 5	17.90%	51.46%

EXPLANATIONS

CUMULATIVE FAILURE SCORE PERFORMANCE:

- **Approval Rate:** To use, select the appropriate projected score or score cutoff that yields the desired approval rate. Approved businesses are companies scoring between the lowest value in the score range (or percentile) and 1836 (or 100 percentile). For example, a credit policy that approves 73% of all businesses requires accepting businesses between 1372 and 1836 (or 31 and 100 percentile). Businesses scoring below the cutoff 1001 - 1371 (1 - 30 percentiles) are reviewed, declined, etc.

- **Failure Rate:** Represents those businesses that score between the lowest value in the score range and 1836 For example, the failure rate for a credit policy which approves all businesses with a score at or above 1372 (or 31 Percentile) is expected to be 46%.

- **% of Failures Eliminated:** 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 1372 (31 Percentile) is expected to eliminate 82.8% 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 1836 (or 100 score). For example, a credit policy which approves all businesses scoring at or above 1372 (or 31 Percentile) should result in a portfolio with 217 Good" businesses for every "Bad" business in the portfolio.

FAILURE 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 1372 and 1380 (or 31 - 35 Percentile) is expected to be 1.38%.

- **% Of Failures Identified:** The percentage of total failed businesses within the score range. For example, 3.89% of all failed companies are expected to score between 1362 - 1371 (or 26 - 30 percentile).

APPENDIX C

GLOSSARY OF SCORING TERMS

TERM	EXPLANATION
D&B Financial Stress Score	D&B Standard Risk Score predicting likelihood of Failure and/or financial distress, also known as the D&B Failure Score
D&B Failure Score	D&B Standard Risk Score predicting likelihood of Failure and/or financial distress, also known as the D&B Financial Stress
Raw Score	Score with a direct relationship to Probability of Default (Failure). The Failure (FSS) form of the raw score is a 4 digit score
1 - 100 Score	Lesser granularity of the Failure Score: Value between 1 and 100 where 1 is the highest probability of default (failure)
Risk Class	Lowest granularity of Failure Score used in some markets (NA/Asia/AU/NZ); Segmentation of the Failure Score (FSS) into 5 risk segments where 1 is lowest probability of default (failure)
Risk Indicator	Lowest granularity of Failure Score used in EU markets; Segmentation of the Failure Score (FSS) into 4 risk segments, where 1 is lowest probability of risk
Scorable Universe	All records in the Data Cloud which meet criteria for score assignment. Examples of records excluded from the Scorable Universe include Out of Business records, Foreign Companies etc.
Scored Universe	All cases which have a score assigned
Observation Point	Date, at which the data sample of active businesses is extracted and data elements observed at that point evaluated as potential predictors
Performance Window	Period where the data sample is monitored to classify businesses as GOOD and BAD
Financial Stress BAD definition	List of Legal Events that define targeted risk behavior
BAD	A business which meets the Bad definition
GOOD	A Business which does not have any information listed within the BAD definition
Out of Business	Business is no longer trading

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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