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Understanding the Austria 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 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 information in the Dun & Bradstreet Data Cloud.

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 our Data Cloud is driven by our proprietary DUNSRight™ Quality Process. DUNSRight™ is our process for collecting and enhancing information, and includes over 2,000 separate automated and manual checks to ensure Dun & Bradstreet data meets the highest quality standards.

The Austria 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 Austrian Failure Scoring System was developed.

AUSTRIA 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 constitute failure in Austria include:

- Voluntary Bankruptcy Petition
- Compulsory Settlement
- Settlement out of Court
- Composition of Bankruptcy
- Composition
- Preliminary Proceedings
- Bankruptcy
- Private Bankruptcy
- Supervising Composition Fulfillments

Cases which are not out of business and have been subject to one or more of the above events for a minimum of one year, will receive a Raw Score of 0, a 1 - 100 Score of 0 and a Risk Indicator of 4.

Cases which are not out of business and have been subject to one or more of the above events for less than a year will remain subject to assessment by the scorecard.

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

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 Austria. The total active universe as at December 2014 was 450,000. This is also known as the Scoreable Universe.

The following are not considered for scoring, are outside of the Scoreable Universe and will have a score value which is blank (null):

- Businesses which are Out of Business
- Public Administration (SIC 91 - 97)
- Membership Organizations (SIC 86)
- Branches of local companies

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 Austria is:

- Company name
- Company address
- A valid Standard Industry Code (SIC)
- Year of foundation
- Legal form

Cases which do not meet this criteria will have a Raw Score of blank (null), a 1 - 100 Score of blank (null) and the Risk Indicator will be dash ('-').

Cases which do not meet this criteria will have a Raw Score of blank (null), a 1-100 Score of blank (null) and the Risk Indicator will be 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 nature disasters. In these special cases additional business rules may be applied in addition to the score calculation. The business rules generated in Austria are listed below:

- Good balance sheet
- Strong parent company
- Public enterprise
- Bad balance sheet
- Weak parent company
- Special event

SCORE DEVELOPMENT PROCESS

The D&B Failure Scorecards were developed using rigorous statistical modeling techniques for all stages of the modelling 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.

The scorecard development process is to extract data 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.

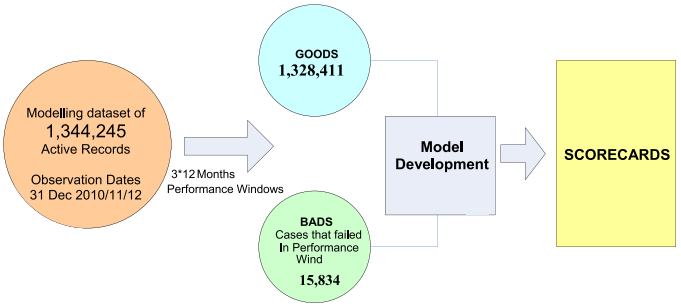
In the development of the Austria D&B Failure Score, the observation windows were 31 December 2010, 31 December 2011 and 31 December 2012. The performance windows were the 12 months from 1 January 2011 to 31 December 2011, 1 January 2012 to 31 December 2012 and 1 January 2013 to 31 December 2013 respectively. A total of 1,344,245 businesses were used in model development. Of this population, 1,328,411 were considered "good" or non-financially stressed companies in the Dun & Bradstreet Data Cloud and 15,834 were considered "bad" or financially stressed companies in the the Dun & Bradstreet Data Cloud.

Sample data elements used in the model include:

- Demographic information such as age of the business
- Financial information
- Dun & Bradstreet proprietary payment behavior information

Appendix A contains a list of data elements which are used in calculating the Failure Score.

The following diagram shows the scorecard development steps:



All active and scoreable businesses were monitored for 36 months. Businesses that failed in any of the three 12-Month periods were identified as BAD for the respective year (and not considered in the following years). The remaining businesses were classified as GOOD. Statistical analysis of the data then identified characteristics that were common to GOOD or BAD businesses. These characteristics are weighted by significance to form rules for our scorecards.

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 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 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 - 1913** is the initial output (sum of assigned points) where 1001 represents businesses that have the highest probability of failure, and 1913 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 1,200, on a marginal basis, represents twice the risk of Failure as a score of 1,240. This score enables a customer to use more granular cutoffs to drive their automated decision-making process.

2. **A "Score" 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.

3. **A "Risk Indicator" of 1 - 4** which is a segmentation of the scoreable 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.

Table 1 shows the distribution of the Failure Risk Indicator in the Austria Dun & Bradstreet Business Universe and includes the associated 1 - 100 Score and Raw Score.

Table 1: Distribution of Failure Risk Indicator in Dun & Bradstreet's File

RISK INDICATOR	% BUSINESSES WITHIN THIS RISK INDICATOR	FAILURE 1 - 100 SCORE	FAILURE RAW SCORE
1	19%	86 - 100	1498 - 1913
2	50%	41 - 85	1342 - 1497
3	26%	17 - 40	1268 - 1341
4	5%	1 - 16	1001 - 1267

SCORECARD PERFORMANCE

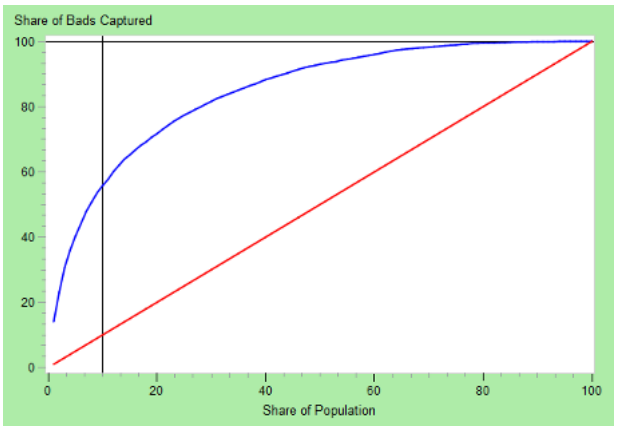
Dun & Bradstreet applies stringent rules to model performance designed to maintain the high performance standards we have set for our scores. Measurements of model performance include an assessment of risk ranking, robustness and discriminate power. Metrics used are:

- 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 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 Failure Score by identifying the failure captured within population groups. For the example, at approximately 20% of the cumulative population, the Failure Scores identified approximately 71.3% of the cumulative "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-Jan-2011 to 31-Dec-2013 failure statistics within the Data Cloud, is 2.51%.

Table 2 provides the average failure rates and cumulative percent of failures identified, based on information in D&B's database, for each Failure Risk Indicator.

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

RISK INDICATOR	% OF D&B FILE REPRESENTED	PROJECTED FAILURE RATE WITHIN RISK INDICATOR	PROJECTED CUMULATIVE % OF FAILURES ELIMINATED
1	19%	0.06%	99.55%
2	50%	0.87%	82.02%
3	26%	3.99%	40.87%
4	5%	20.03%	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 20.03% of all businesses scoring a Risk Indicator of 4 as at 31 December 2010 or 31 December 2011 or 31 December 2012 failed between 1 January 2011 - 31 December 2011, 1 January 2012 - 31 December 2012 or 1 January 2013 - 31 December 2013 respectively. What this means is that businesses scoring in the Failure Risk Indicator 4 are approximately 8 times more 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 (NACE).

Table 3: National Average Failure Rate by Industry

MAJOR INDUSTRY GROUP	PROJECTED FAILURE RATE	INDUSTRY IN ALL POPULATION
Agriculture, Forestry, Fishing	1.68%	1.26%
Mining	0.67%	0.27%
Construction	3.43%	15.89%
Manufacturing, Consumer Goods	1.58%	4.66%
Manufacturing, Investment Goods	1.47%	5.86%
Transportation, Communications	4.73%	5.51%
Wholesale Trade	1.98%	11.78%
Retail Trade	3.44%	18.75%
Finance, Insurance, Real Estate	1.04%	10.17%
Services	2.59%	15.92%
Public Services	1.26%	9.92%

APPENDIX A

EXAMPLES 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/Public Records Information

FACTOR	IMPACT ON MODEL
Age of Company	In general, more established business have greater stability, and hence the lower the risk.

Financial Information

FACTOR	IMPACT ON MODEL
Equity Ratio	Typically businesses with negative or small Equity Ratio values (Ratio of Equity vs Total Capital) are more risky than businesses with higher one.
Return on Asset	The higher the return on asset (ratio of profit vs total assets), the lower the risk of failure of a business.

Payment Information

FACTOR	IMPACT ON MODEL
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.

Negative Information

FACTOR	IMPACT ON MODEL
Sum_inkasso_1y	Sum of significant inkasso (debt collection) cases in the last 12 months. Companies with debt collection cases tend to be more risky

APPENDIX B

The following Summary and Detailed Projected Performance Tables are based on Dun & Bradstreet information between 1 January 2011 and 31 December 2013. Actual performance for a customer portfolio may vary based on the account selection within that portfolio.

SUMMARY PROJECTED PERFORMANCE TABLE

CUMULATIVE FAILURE SCORE PERFORMANCE						
RISK INDICATOR	RAW SCORE RANGE	1 - 100 SCORE RANGE	% OF BUSINESSES (APPROX.)	FAILURE RATE	% OF FAILURES ELIMINATED	GOOD-BAD RATIO
1	1498 - 1913	86 - 100	19%	0.06%	99.55%	1645
2	1342 - 1913	41 - 100	69%	0.65%	82.02%	152
3	1268 - 1913	17 - 100	95%	1.56%	40.87%	63
4	1001 - 1913	1 - 100	100%	2.51%	0.00%	39

FAILURE SCORE PERFORMANCE WITHIN RANGE				
RAW SCORE RANGE	1 - 100 SCORE RANGE	% WITHIN RANGE (APPROX.)	FAILURE RATE	% OF FAILURES IDENTIFIED
1498 - 1913	86 - 100	19%	0.06%	0.45%
1342 - 1497	41 - 85	50%	0.87%	17.53%
1268 - 1341	17 - 40	26%	3.99%	41.15%
1001 - 1267	1 - 16	5%	20.03%	40.87%

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 95% of all customers requires accepting businesses scoring at or above 1268 (or 17 - 100 score). Businesses scoring below the cutoff score 1316 are reviewed, declined, etc.

- **Failure Rate:** The failure rate represents those businesses that score between the lowest value in the score range (or score) and 1913 (or 100 score). For example, the failure rate for a credit policy which approves all businesses with a score at or above 1268 (or 17 - 100 score) is expected to be 1.56%.

- **% 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 1268 (or 17 - 100 score) is expected to eliminate 40.87% 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 1913 (or 100 score). For example, a credit policy that approves all businesses scoring at or above 1268 (or 17 - 100 score) should result in a portfolio with 63 "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 - 1267 (or 1 - 16 score) is expected to be 20.03%.

- **% Of Failures Identified:** The percentage of total failed businesses within the score range. For example, 40.87% of failed businesses are expected to score between 1001 - 1267 (or 1 - 16 score).

DETAILED PROJECTED PERFORMANCE TABLE

CUMULATIVE FAILURE SCORE PERFORMANCE						FAILURE SCORE PERFORMANCE WITHIN RANGE			
RAW SCORE RANGE	1 - 100 SCORE RANGE	% OF BUSINESSES (APPROX.)	FAILURE RATE	% OF FAILURES ELIMINATED	GOOD-BAD RATIO	RAW SCORE RANGE	1 - 100 SCORE RANGE (APPROX.)	FAILURE RATE	% OF FAILURES IDENTIFIED
1581 - 1913	97 - 100	6%	0.01%	99.98%	12310	1581 - 1913	97 - 100	0.01%	0.02%
1542 - 1913	93 - 100	11%	0.03%	99.86%	3072	1542 - 1580	93 - 96	0.06%	0.12%
1516 - 1913	89 - 100	15%	0.04%	99.73%	2225	1516 - 1541	89 - 92	0.08%	0.13%
1489 - 1913	84 - 100	20%	0.07%	99.46%	1509	1489 - 1515	84 - 88	0.13%	0.26%
1465 - 1913	79 - 100	26%	0.11%	98.90%	932	1465 - 1488	79 - 83	0.26%	0.56%
1444 - 1913	75 - 100	31%	0.15%	98.16%	670	1444 - 1464	75 - 78	0.35%	0.74%
1429 - 1913	71 - 100	36%	0.18%	97.38%	541	1429 - 1443	71 - 74	0.42%	0.78%
1415 - 1913	67 - 100	40%	0.25%	95.93%	394	1415 - 1428	67 - 70	0.77%	1.45%
1403 - 1913	63 - 100	45%	0.29%	94.83%	348	1403 - 1414	63 - 66	0.57%	1.11%
1390 - 1913	58 - 100	50%	0.34%	93.22%	295	1390 - 1402	58 - 62	0.80%	1.61%
1376 - 1913	52 - 100	56%	0.41%	90.86%	242	1376 - 1389	52 - 57	1.09%	2.37%
1361 - 1913	47 - 100	62%	0.51%	87.46%	195	1361 - 1375	47 - 51	1.44%	3.39%
1349 - 1913	43 - 100	66%	0.60%	84.08%	165	1349 - 1360	43 - 46	1.84%	3.38%
1338 - 1913	40 - 100	70%	0.69%	80.53%	143	1338 - 1348	40 - 42	2.11%	3.55%
1326 - 1913	36 - 100	77%	0.82%	74.98%	121	1326 - 1337	36 -39	2.30%	5.55%
1320 - 1913	34 - 100	81%	0.92%	70.51%	108	1320 - 1325	34 - 35	2.64%	4.47%
1311 - 1913	31 - 100	86%	1.06%	63.43%	93	1311 - 1319	31 - 33	3.17%	7.08%
1293 - 1913	25 - 100	91%	1.27%	54.14%	78	1293 - 1310	25 - 30	5.27%	9.29%
1264 - 1913	16 - 100	95%	1.61%	38.79%	61	1264 - 1292	16 - 24	8.35%	15.34%
1001 - 1913	1 - 100	100%	2.51%	0.00%	39	1001 - 1263	1 - 15	21.23%	38.79%

EXPLANATIONS

CUMULATIVE FAILURE SCORE PERFORMANCE

- **Approval Rate:** To use, select the appropriate projected score cutoff that yields the desired approval rate. Approved businesses are companies scoring between the lowest value in the score range (or score) and 1913 (or 100 score). For example, a credit policy that approves 70% of all businesses requires accepting businesses between 1339 - 1913 (or 40 - 100 score). Businesses scoring below the cutoff (1001 - 1338) are reviewed, declined, etc.

- **Failure Rate:** Represents those businesses that score between the lowest value in the score range and 1913 For example, the failure rate for a credit policy which approves all businesses with a score at or above 1339 (or 40 - 100 score) is expected to be 0.68%.

- **% 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 1339 (40 - 100 score) is expected to eliminate 80.91% 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 1913 (or 100 score). For example, a credit policy which approves all businesses scoring at or above 1339 (or 40 - 100 score) should result in a portfolio with 145 "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 1328 - 1338 (or 36 - 39 score) is expected to be 2.39%.

- **% of Failures Identified:** The percentage of total failed businesses within the score range. For example, 4.90% of all failed companies are expected to score between 1328 - 1338 (or 36 - 39 score).

APPENDIX C

GLOSSARY OF SCORING TERMS

TERM	EXPLANATION
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 Score (FSS)
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
Scoreable Universe	All records in the Data Cloud which meet criteria for score assignment. Examples of records excluded from the Scoreable 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