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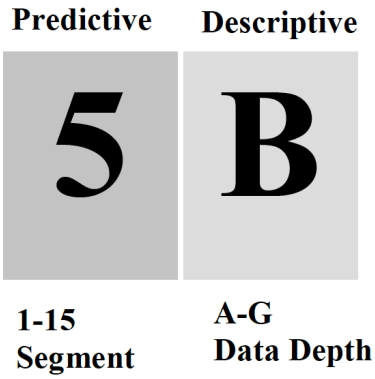
Understanding Global Business Ranking

This document is intended to address the following questions:

- What does the Global Business Ranking predict?
- What are the availability rules?
- What is the model development process?
- What is the model performance?
- What are some of the key attributes used by the model?

I. INTRODUCTION

The Global Business Ranking (GBR) is a multi-dimensional risk ranking tool that provides consistent risk assessment on businesses worldwide. It is comprised of a predictive and a descriptive component. The predictive component predicts the likelihood that a company will go out of business, become inoperable or inactive over the next 12 months. The descriptive component provides insights into the level of predictive data available to make a reliable assessment of a business.



The predictive component uses statistical probabilities to classify businesses in the Dun & Bradstreet Data Cloud into 1-15 risk segments. These classifications are based on the chance that a company will go out of business, file for events such as bankruptcy, insolvency, receivership and others, or become inactive over the next 12-months. A score of 1 represents the lowest probability while a score of 15 is the highest probability.

The descriptive component is known as the Data Depth measure. It uses a point system to assign numeric value to a data attribute based on its ability to enhance the predictive accuracy of the score. It is based on a rating of A-G and H-R. A is assigned to businesses with the highest level of predictive data and G is assigned to businesses with the lowest level of predictive data. H-R are special categories that override the A-G rating providing further insight when Dun & Bradstreet has confirmation that a business has met a specific risk condition.

Our proprietary DUNSRight™ Quality Process ensures the integrity of the information contained in our database. DUNSRight is our process for collecting and enhancing information. Our expert team of statisticians and economists lead the development of our Predictive Indicator, the fifth and final component of the sequential DUNSRight process, and are responsible for turning our vast Data Cloud into actionable business insights.

GBR is based on segmentation analysis and subsequent regression analysis using a scorecard approach - resulting in a rating system that helps our customers solve a wide range of business problems, and is highly effective in helping to predict the future of businesses across borders in a consistent manner. The solution helps customers solve a number of business problems including:

- Gaining consistency in global workflows by providing a globally consistent and comparable risk metric
- Gaining efficiencies in auto decisioning on global portfolios freeing up costly manual effort
- Facilitating cross border comparison of customers, prospects and suppliers
- Identifying and evaluating suppliers from low cost countries
- Proving a competitive advantage through enhanced visibility into global footprints by identifying prospects and customers in emerging markets
- Gaining confidence in the depth of data driving a reliable risk assessment or automated, score-based decision
- Providing a warning system that helps to proactively identify and manage risk in a global portfolio

II. WHAT DOES THE PREDICTIVE COMPONENT OF THE GLOBAL BUSINESS RANKING PREDICT AND WHAT INSIGHT DOES THE DATA DEPTH INDICATOR DELIVER?

GBR predicts a business' likelihood of:

- Voluntarily or involuntarily going out of business
- Encountering lead up events such as filing for bankruptcy, insolvency, administration and others
- Becoming dormant or inactive

Businesses that meet one of the above criteria is termed as "Bads" in this document and is meant to refer to the business events that GBR is built to predict.

The underlying models for the GBR are based upon the observed characteristics of millions businesses in the Dun & Bradstreet Data Cloud and the relationship these characteristics have to the probability of meeting the above definition.

A Risk Segmentation of 1 – 15 is assigned by the model. This is a segmentation of the scorable universe into fifteen distinct risk groups where a one (1) represents businesses that have the lowest probability of going out of business, becoming inoperable or inactive, and fifteen (15) represents businesses with the highest probability.

The Data Depth Indicator provides insights into the level of predictive data elements available on a business. It allows customers to understand and have confidence in the underlying data inputs used to assess a business. Scale ranges from A-G, with A being records with the deepest, predictive data, and G referring to businesses with a level of descriptive data that has limited predictive value. Special categories H-R are assigned to businesses with special risk circumstances such as bankruptcy, inactivity, out of business, and others. Refer to Appendix A for the key to the Data Depth Indicator.

III. AVAILABILITY OF THE GLOBAL BUSINESS RANKING

The Global Business Ranking is available on approximately 133 million active businesses in the Data Cloud.

- Branch locations will trade up to immediate Headquarters
- Business designated as Out of Business (Data Depth of H) or Unable to Confirm.,(Data Depth of I) will not be assigned a GBR value
- Businesses flagged for Unfavorable Bankruptcy (Data Depth of J) and Business Financial Embarrassment (Data Depth of R) will be assigned a GBR value of 15

IV. MODEL DEVELOPMENT PROCESS

The predictive component of the Global Business Ranking was developed using state-of-the-art statistical modeling techniques to select and weight the data elements that are most predictive of business closure, inoperability and inactivity. The resulting models are mathematical equations that consist of a series of variables and coefficients (weights) that have been calculated for each variable.

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 performance window defines the length of time the businesses in the sample are tracked to examine their performance.

In the development of the Global Business Ranking, the observation point was December 2012 and the performance window was the twelve months from January 2013 to December 2014. A total of 14 million records, 9 million from the Dun & Bradstreet Data Cloud and 5 million extracted from local markets, was used in development. Of this population, approximately 7.5% went out of business, became inoperative or inactive during the performance window and were considered "Bads" companies in the development sample.

From the observation point, Dun & Bradstreet performed extensive data analysis to determine those variables that are statistically the most significant factors for predicting closure, inactivity and bankruptcy and calculate the appropriate weights for each. Only Dun & Bradstreet, with its access to a Data Cloud of approximately 133 million active global 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 D&B Data Cloud.

Dun & Bradstreet's investments in data and insight activities have enabled the use of business activity "signals". These "signals" are particularly beneficial to differentiate between low and high risk on businesses in emerging markets that tend to have limited or no commercial information. The use of Intelligence Change Management (ICM) uses Firmographics information to identify critical changes such as change in management, and country level macroeconomic data are unique to this score. Apart from these unique data elements, the GBR also utilizes traditional data elements such as demographic, trade, public records, derogatory (Director Failure, Collection events, and others), and financial information. The use of all available data elements at a record level has allowed GBR to provide 100% coverage on active records in the Data Cloud. Appendix B contains a sample critical data elements used by the predictive components of the GBR.

V. MODELING APPROACH – SEGMENTATION AND SCORING

The Global Business Ranking uses a building block approach so businesses with varying levels of data depth can be assessed. Scorecards are segmented based on level of depth. For example, separate scorecards have been developed using macroeconomic data only,

Firmographics only, with trade and/or public records, with financial statement attributes. The output of each scorecard is brought to a consistent scale. To account for the differences in the meaning and availability of variables by country, similar data elements have been clustered, raw variables transformed to common derived attributes and then ranked into segments of 1-15.

GBR is comprised of two models, with a suite of scorecards underlying each of the models. The two models are:

- Basic GBR – this model utilizes Firmographics, Signals, and Macroeconomic data. Every record in the Dun & Bradstreet Data Cloud has at least one of these components allowing us to score 100% of the active universe
- Robust GBR – Utilizes local country data such as trade, financials and derogatory from a set of core markets in addition to data components used by Basic GBR. The list of core markets is listed in Appendix C. This list is expected to expand as additional local market data becomes available.

The final score provides a 1-15 ranking based on values derived from the Basic and Robust models. In the absence of local market data or on records without trade, demographics and derogatory information, the final GBR ranking will be based on Basic model.

VI. MODEL PERFORMANCE

One way to measure model performance is by examining its screening effectiveness. That is, how good is the model in screening the "goods" from the "bads". The screening effectiveness table below (Table 1) shows the screening effectiveness of GBR including Basic and Robust.

Table 1. Screening Effectiveness of GBR

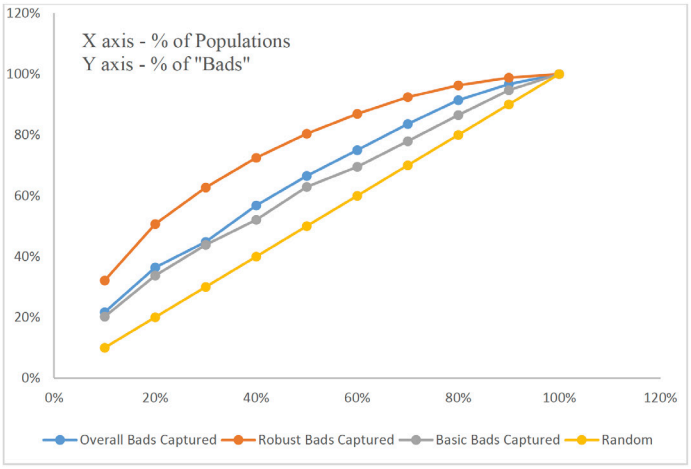
% OF RECORDS	OVERALL "BADS" CAPTURED	ROBUST "BADS" CAPTURED	BASIC "BADS" CAPTURED
10%	22%	32.1%	20.2%
20%	36%	50.7%	33.7%
30%	45%	62.7%	43.8%
40%	57%	72.5%	52.1%
50%	67%	80.4%	62.9%
60%	75%	86.9%	69.5%
70%	84%	92.4%	77.9%
80%	91%	96.3%	86.5%
90%	97%	98.8%	94.7%
100%	100%	100.0%	100.0%

Explanation:

In the riskiest 10% of the population, Overall GBR captures 22% of "bads". By eliminating the worst scoring 10% of the businesses, you would expect to avoid 22% of the "bads" in your global portfolio. The Robust GBR captures 32.1% and the Basic GBR captures 20.2% in the worst scoring 10% of the population.

The trade-off curve in Graph1 illustrates the screening effectiveness by plot of ascending accumulation of good accounts vs. "bad" accounts. It is useful for illustrating model performance both at a particular score and across the spectrum of score distribution.

Graph 1: GBR Trade off Curve



During the course of model development, various statistics from the development sample are gathered similar to the trade-off curve shown above. This includes KS and Gini Index outlined in the below table.

Performance Statistics	Explanation	Overall GBR	Robust GBR	Basic GBR
Kolmogorov-Smirnov (KS)	Measures the separation at the greatest point between the cumulative density functions of the good and bad accounts -- i.e. the maximum difference between these two functions.	18	34	15
Performance Index (PI) or Gini Index	Measures the ability of a model to isolate the bad accounts into the lowest scores. It compares the actual screening effectiveness to a "perfect" outcome where all the bad accounts would score lower than all good accounts and expresses this comparison as a ratio where 100 is perfect and 0 is random. The PI measures how the distribution varies across the entire score range.	22	47	20

Development statistics provide useful information that can be used to help management determine 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. Dun & Bradstreet has undertaken extensive validation of GBR include in Out of Time sample and several global customer portfolios.

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.

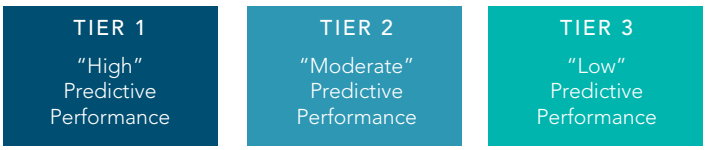
Nevertheless, models are robust tools for rank-ordering risk in changing circumstances; higher scoring businesses perform better than lower scoring businesses. Tracking the score distributions and the actual performance of accounts provides the most accurate projections for individual portfolios.

GBR Performance by Market

GBR Performance varies by markets due to the following reasons:

- GBR is a broad based global score and is not designed to factor local market nuances or optimize local market data availability. As a result, it is better suited for some markets than others.
- The quality of "Bads" and underlying data attributes differ due to local market barriers that hinder flow of commercial data

Markets are clustered into three tiers based on their predictive performance.



TIER 1: consists of markets where the model carries "High" predictive performance driven by rich underlying data. In these markets, GBR provides robust insights and can be used for comprehensive assessment of a business.

TIER 2: consists of markets where the model carries "Moderate" predictive performance. In these markets, GBR is directional in nature and should be combined with other Dun & Bradstreet scores and data points (where available).

TIER 3: consists of markets where the model carries "Low" predictive performance. In these markets, GBR should be used as a starting point to derive insights on a company and be combined with other internal and external intelligence available on the business.

VII. RELATIONSHIP BETWEEN GBR AND PROJECTED OUT OF BUSINESS RATES

The projected "bad" rate, also referred to as Out of Business rate, is 7.5%.

Table 1 provides the projected Out of Business rate based on a recent out-of-time sample from the Dun & Bradstreet Data Cloud as of December 2014.

Table 1 – GBR Projected Out of Business Rate

GBR SEGMENTS	OUT OF BUSINESS RATE	% OF RECORDS
15	36.3%	0.8%
14	16.9%	3.6%
13	14.5%	1.1%
12	12.6%	5.9%
11	11.1%	1.2%
10	10.7%	5.3%
9	7.8%	13.2%
8	7.4%	22.2%
7	6.6%	15.3%
6	6.0%	8.3%
5	5.5%	4.9%
4	4.7%	2.0%
3	4.0%	4.1%
2	3.1%	2.1%
1	2.5%	10.0%

Each GBR has a "bad" rate that can be compared with the average. For example, the table above shows that 0.80% of all companies scored a 15 and of that group, 36.3% are projected to go out of business, became inactive, or inoperable over the next 12 months. What this means is that businesses with a GBR of 15 are approximately 4.84 times (36.3/7.5 = 4.84) more likely to go bad than the average and 14.52 times (36.3/2.5 = 14.52) more likely to go bad than the businesses with a GBR of 1. Appendix D contains complete Projected Performance tables.

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Appendix A

Data Depth Indicator Detailed Table

Data Depth shows how much predictive data is available on that entity to make a reliable risk assessment. Data Depth provides transparency into level of critical business intelligence available on a business. Data Depth is based on a scale with A-G, with A representing business with the richest data depth, and G representing businesses with no company specific information.

DATA DEPTH	DESCRIPTION	LEVEL OF INSIGHT
A	Financials with Trade	Robust Predictions
B	Financials Only	
C	Thick Trade Only	
D	Thin Trade Only	Directional
E	Full Firmographics and Signals	
F	Full Firmographics without Signals or Partial Firmographics with/without Signals	Basic
G	Macroeconomic Only	

Data Depth of H-R represent special Data Depth categories that capture high risk scenarios.

DATA DEPTH	DESCRIPTION
H	Out of Business
I	Unable to Confirm Designation
J	Unfavorable Bankruptcy
K	High Risk - Severe Risk
L	Self-Reported D-U-N-S Support Record
M	Business Deterioration - Severe Risk
N	Insolvency/Unable to Pay Debts
O	Record is Delisted
P	Ceased Trading and Liquidation Process
R	Business Financial Embarrassment

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Appendix B

List of Data Elements Used in Global Business Ranking

Following is a list of some of the data elements used in the predictive components of the GBR. The variables used and their weights vary by scorecard.

FIRMOGRAPHICS, SIGNALS, AND MACROECONOMIC

FACTOR	IMPACT ON MODEL
Business Age	How long a business has been operating is a measure of stability. The more years the business has been operating, the lower the risk.
Employee Size, SIC	"Bad" are calculated by employee size segments and SIC (Industry segments). Those segments with lower "Bad" rates are less risky.
Business Activity Signals	Signs of business activity derived from Dun & Bradstreet proprietary databases such as Match Audit, Global Cross Border Inquiries and Intelligence Change Management. In majority of the categories, higher the number and frequency of signals, lower the risk.
Macroeconomic	Calculates macroeconomic risk in a market based on factors such as political stability, country bad rate, unemployment rate, percent of GDP growth, average tone of media events, current account as percentage of GDP, annual average inflation and others. Those markets with higher "Bad" rates are considered risky.

FINANCIAL INFORMATION

FACTOR	IMPACT ON MODEL
Net Worth	Negative or low Net Worth businesses tend to be high risk. Large businesses are on an average carry lower risk.
Age of Financial Statements	The more recent the financial statement information, the lower the risk. If the most recent financial statement is more than 26 months old, it is an indication of higher risk.
Return on Assets (ROA)	Higher ROA implies better performance and so carries lower risk. Negative or missing ROA denotes high risk.
Cash and Cash Equivalents	Cash and cash equivalents are liquidity measures. Higher balances imply lower risk and vice versa.
Sales per Employees	Lower sales per employees is an indication of higher risk and vice versa.

TRADE PAYMENTS

FACTOR	IMPACT ON MODEL
Number of Payment Experiences	On average, no trade information or single trade payment indicates higher risk.
Paydex	A high Paydex implies low risk, while a low Paydex implies higher risk.
Percent of account 30 days past due	The model weights the percentage of payment experiences that are 30 days past due. Higher the percentage of payment experiences that fall within this category, the higher the risk.
Percent of Satisfactory Experiences	The model weights the percentage satisfactory payment experiences in the Dun & Bradstreet Data Cloud. 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 60 DPD Accounts Relative to 30 DPD	The model weights the percentage trade payments that are 60 days past due relative to trade payments that are 30 days past due. Higher percentage indicates greater risk.
Percent of 90 DPD Accounts Relative to 30 DPD	The model weights the percentage trade payments that are 90 days past due relative to trade payments that are 30 days past due. Higher percentage indicates greater risk.

DEROGATORY INFORMATION

FACTOR	IMPACT ON MODEL
Suits, Liens, and Judgments	The presence, as well as the number, 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.
Derogatory Events	Current and historical derogatory events such as Debt collection, Court ruled Payments, Director Failure indicate high risk.
Director Failure	The model looks at the presence and count of Director/Owners/Principals failure. Presence of a past failure indicates high risk. A more recent failure indicates even higher risk.
Recency of public records and derogatory events	In addition to evidence of public records and derogatory events, the model looks at recency of those events. A more recent derogatory event is an indication of higher risk.

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Appendix C

Core Markets with Local Market Data

The current version of GBR is supported by local data provided by the following set of core markets. GBR will be enhanced on an ongoing basis as local data is received from additional markets.

1. Argentina
2. Australia
3. Austria
4. Belgium
5. Brazil
6. Canada
7. Czech Republic
8. Denmark
9. Finland
10. France
11. French Guiana
12. Germany
13. Greece
14. Guadeloupe
15. Hungary
16. India
17. Ireland
18. Italy
19. Japan
20. Korea Republic of
21. Liechtenstein
22. Lithuania
23. Luxemburg
24. Mainland China and Hong Kong
25. Martinique
26. Mexico
27. Monaco
28. Netherlands
29. New Zealand
30. Northern Ireland
31. Norway
32. Portugal
33. Reunion
34. Russian Federation
35. Scotland
36. Slovakia
37. Spain
38. Sweden
39. Switzerland
40. Thailand
41. Turkey
42. United Kingdom
43. United States
44. Vietnam
45. Wales

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Appendix D

GBR Performance Tables

SEGMENTS	PERCENT OF POPULATION	OUT OF BUSINESS RATE	CUMULATIVE OUT OF BUSINESS RATE	CUMULATIVE PERCENT OF POPULATION	CUMULATIVE PERCENT OF BAD CAPTURED
15	0.8%	36.3%	36.3%	1%	4%
14	3.6%	16.9%	20.3%	4%	12%
13	1.1%	14.5%	19.1%	6%	14%
12	5.9%	12.6%	15.8%	11%	24%
11	1.2%	11.1%	15.3%	13%	26%
10	5.3%	10.7%	14.0%	18%	33%
9	13.2%	7.8%	11.4%	31%	47%
8	22.2%	7.4%	9.7%	53%	69%
7	15.3%	6.6%	9.0%	69%	82%
6	8.3%	6.0%	8.7%	77%	89%
5	4.9%	5.5%	8.5%	82%	92%
4	2.0%	4.7%	8.4%	84%	94%
3	4.1%	4.0%	8.2%	88%	96%
2	2.1%	3.1%	8.1%	90%	97%
1	10.0%	2.5%	7.5%	100%	100%

EXPLANATION:

Segments: Ranges from 1 to 15, with 1 representing least likelihood of going out of business, becoming inoperable or inactive and 15 representing highest likelihood.

Percent of Total: Indicates what percent of businesses within Dun & Bradstreet Data Cloud have a specified GBR risk segment. For example 5.3% of businesses in the Dun & Bradstreet Data Cloud has a GBR of 10.

Out of Business Rate: Indicates what percent of businesses is expected to go out of business, inoperable or inactive over next 12 months. For example, the OOB rate associated with GBR of 10 is 10.7%. This means approximately 11 out of 100 businesses with a GBR of 10 are predicted to go bad over the next 12 months.

Cumulative Out of Business Rate: Indicates the cumulative bad rate within a score range. For example, across score ranges 10-15, 14% of all businesses are projected to go bad.Cumulative Percent of Total: Indicates what cumulative percent of the businesses within the Dun & Bradstreet Data Cloud fall within a GBR range. For example, 18% of global businesses have a GBR of 10-15.

Cumulative Percent of Bads Captured: Indicates what cumulative percent of the bads are captured within the score range. For example, 33% of all businesses that go bad have a GBR range of 10-15.

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Appendix E

Out of Business Rate by Market/Region

MARKET/REGION	BAD RATE
Australia	5.91%
Austria	7.30%
Belgium	6.80%
Brazil	13.27%
Bulgaria	10.78%
Canada	5.91%
China	10.04%
Columbia	11.87%
Croatia	10.31%
Denmark	5.75%
Estonia	8.61%
Finland	5.18%
France	7.00%
Germany	5.55%
Greece	12.56%
Hong Kong SAR	6.03%
Hungary	10.66%
India	11.26%
Ireland	7.33%
Israel	8.29%
Italy	9.98%
Japan	6.25%

MARKET/REGION	BAD RATE
Luxembourg	4.82%
Netherlands	5.99%
New Zealand	6.56%
Norway	4.39%
Peru	11.89%
Poland	10.04%
Portugal	9.86%
Romania	11.81%
Russian Federation	13.03%
Serbia & Montenegro	12.47%
Singapore	5.88%
Slovakia	10.77%
Slovenia	9.52%
South Africa	11.28%
Spain	9.95%
Sweden	5.01%
Switzerland	4.48%
Taiwan	6.03%
Turkey	10.32%
UK	6.41%
Ukraine	14.65%
US	6.52%

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ABOUT DUN & BRADSTREET

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