



GEMS[®] Expert View Parameterization

United States Corporate Credit Targets

Prepared for the NAIC

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1 Introduction

Target-setting is the process of defining a range of desirable statistical properties (e.g., mean, standard deviation, skewness etc.) for the output of a model. These targets are used as guiding constraints during model estimation and help to ensure that model output and parameters are stable through time. In the GEMS® Expert View Parameterization, these targets are based upon historical behavior as well as a defined process of applying expert judgment. This document covers the methodology for setting corporate bond credit spread and transition and default probabilities for the United States economy.

Before defining a specific target-setting methodology for each asset class, a number of principles and requirements were set to guide the process. Ideally, any methodology would satisfy the following principles:

- 1) Enable the setting of long-term or steady-state targets for the mean and standard deviation of key variables
- 2) Any target-setting methodology should lead to targets that remain stable through time
- 3) The target-setting methodology should be consistent across economies and, by extension broadly applicable irrespective of geographic, economic, or other differences
- 4) The lack of availability of data should ideally not overly impede the setting of targets
- 5) Methodology should be justifiable based on the data available and the latest thinking in the academic literature
- 6) The methodology should lead to targets that are appropriate and meet the expectations of the many markets the GEMS® product serves
- 7) As much as possible, the methodology should be prescriptive, allowing targets to be set by following a well-defined procedure

While it may not always be possible to satisfy these requirements, they serve as useful guidance when differentiating between different target-setting methodologies.

2 GEMS® Expert View US Credit Spread Target-Setting Methodology

2.1 Choice of Data Window

In the case of corporate credit spreads, there is significantly less historical data than for many other asset classes (e.g., government bonds or equity). For the US, data is available from April 1991 and, with the exception of AAA ratings, is relatively complete for all rating classes through the 2008 financial crisis.

Due to the relative paucity of data, we use all credit spread data available to us for the analysis and inference of credit targets.

3 Corporate Credit Target-Setting Methodology

3.1 United States Credit Spread Targets

The process of setting corporate credit spread targets follows a well-prescribed methodology.

The first step in this process is to set targets for United States credit spread mean and standard deviation targets. Figure 1 shows US spread data from 1991 to 2018.

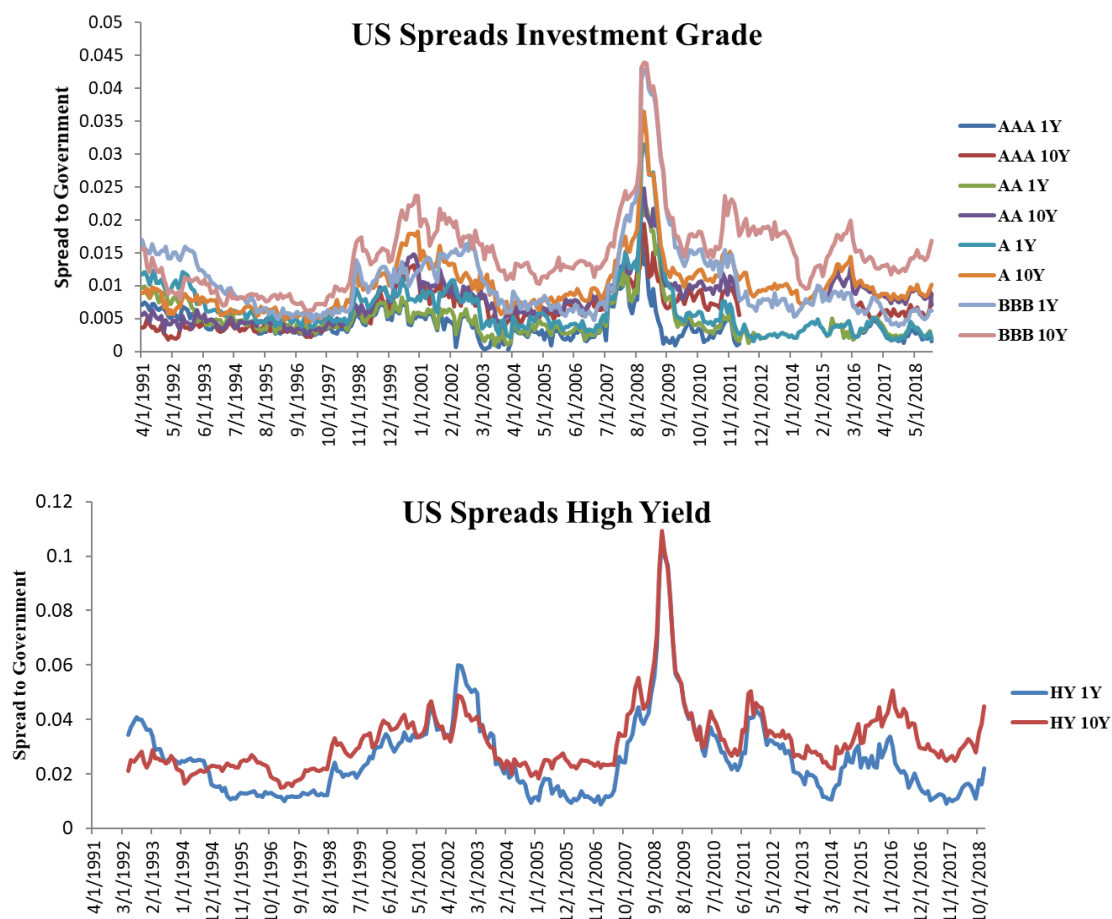


Figure 1: Historical US credit spreads on corporate bonds of different ratings and tenors separated by Investment Grade and High Yield (BB). Prepared by Conning, Inc. Source: ©2019 Bloomberg, L.P.

Looking at the data in Figure 1, we might split the historical data into 4 distinct periods:

1. A low-volatility period at the start of the available history from 1991–1998
2. A medium-volatility period prior to the 2007/2008 crisis between 1998–2006
3. A “jump” period characterized by rapidly increasing spreads, high spread levels, and high volatility between year-end 2006 and mid-2010
4. A second medium-volatility period which appears on inspection similar to the first. This period is from mid-2010 to the end of the historical series

It is our view that the targets for the mean should reflect the average expected behavior of credit spreads over the medium to long term. Given our observations 2 and 4 above, it would seem that the two medium-volatility periods are representative of what we might consider to be a “normal” market environment. If we look at the statistics for these two periods in Figure 2, we observe that the mean values were also broadly similar during these two periods.

		AAA 1Y	AAA 10Y	AA 1Y	AA 10Y	A 1Y	A 10Y	BBB 1Y	BBB 10Y	HY 1Y	HY 10Y
June 2010-2018	<i>Mean</i>	0.0028	0.0068	0.0033	0.0094	0.0035	0.0102	0.0083	0.0158	0.0225	0.0335
"Post Jump"	<i>Stdev</i>	0.0011	0.0014	0.0011	0.0013	0.0014	0.0018	0.0031	0.0031	0.0086	0.0068
	<i>Max</i>	0.0054	0.0100	0.0064	0.0129	0.0076	0.0152	0.0155	0.0237	0.0437	0.0507
Dec 1998-Dec 2006	<i>Mean</i>	0.0037	0.0073	0.0044	0.0081	0.0064	0.0105	0.0102	0.0155	0.0266	0.0312
"Ex-Low Vol Period"	<i>Stdev</i>	0.0019	0.0023	0.0017	0.0025	0.0024	0.0032	0.0033	0.0034	0.0128	0.0075
	<i>Max</i>	0.0074	0.0132	0.0082	0.0148	0.0111	0.0183	0.0176	0.0237	0.0601	0.0488

Figure 2: Statistical properties of US Credit spreads in two historical periods, 2010–2018 and 1998–2006. Prepared by Conning, Inc. Source: ©2019 Bloomberg, L.P.

This is particularly true for the 10-year tenor. For the 1-year tenor, the A-rated spreads show the most significant differences.

Taking this into account, the following methodology is applied to form targets for the mean spreads:

1. Investment-grade mean spreads are set at the midpoint between the measured values in the two “normal” periods.
2. 10-year HY spreads are set at the midpoint between measured values in the two “normal” periods.
3. The 1-year HY spreads are set at 65bps below the 10-year High Yield spread. This is close to the difference between the BBB 1-year and 10-year tenor (64bps) and ensures that the High Yield spread curve is not too steep relative to the steepness we observe in the data.

Applying this method leads to the following targets:

	<i>Target Mean</i>
AAA 1Y	0.00326
AAA 10Y	0.00706
AA 1Y	0.00385
AA 10Y	0.00875
A 1Y	0.00496
A 10Y	0.01033
BBB 1Y	0.00929
BBB 10Y	0.01566
HY 1Y	0.02584
HY 10Y	0.03234

Figure 3: Target mean credit spreads for US industrial sector corporate bonds of different ratings and tenors. Prepared by Conning, Inc.

Next, we move to the setting of targets for the standard deviation or volatility. For this we use the broadest possible view and take account of all the available data, setting the target at the historical value. This also requires the least amount of expert judgment and is perhaps the most justifiable approach to take in the absence of any evidence to the contrary. Including the 2008 crisis in the volatility measure will ensure that a reasonable and wide range of values is recreated by the simulation, including the moderate extremes (with tail events generated separately by the inclusion of a jump process in some of the models). The values have been checked for consistency (e.g., that the volatility increases with rating) and appear reasonable. The final mean and standard deviation targets are shown in Figure 4 below.

<i>US Spread Targets</i>	Target Mean	Target Stdev	GEMS Official Target Mean	GEMS Official Target Stdev
AAA 1Y	0.00326	0.00237	0.0043	0.0023
AAA 10Y	0.00706	0.00288	0.0064	0.0025
AA 1Y	0.00385	0.00322	0.0056	0.0031
AA 10Y	0.00875	0.00362	0.0075	0.0032
A 1Y	0.00496	0.00441	0.0076	0.0041
A 10Y	0.01033	0.00428	0.01	0.0041
BBB 1Y	0.00929	0.00632	0.012	0.006
BBB 10Y	0.01566	0.00607	0.0145	0.0057
HY 1Y	0.02584	0.01490	0.0431	0.0197
HY 10Y	0.03234	0.01244	0.0503	0.0176

Figure 4: Target mean and standard deviations for US credit spreads (industrial sector) on corporate bonds of different ratings and tenors. Prepared by Conning, Inc.

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