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**Addendum 2 to the CRI Technical Report (Version: 2021, Update 1)**

This document updates the Technical Report (Version: 2021, Update 1) and details the CRI changes resulting from switching to the 2020 version of the Bloomberg Industry Classification Standard (BICS) from its 2007 version. The changes have been implemented for the computation of the Probabilities of Defaults (PDs) and Actuarial Spreads (AS)<sup>1</sup> since 14 Mar 2022. The CRI web display offers the option to users to choose between the NUS-CRI 2020 (default) and 2007 classification standards based on their preference.

**Switching Industry Classification Standard from NUS-CRI 2007 to NUS-CRI 2020 based on BICS 2007 and BICS 2020 respectively**

This addendum describes the change in the industry classification standard used by NUS-CRI which has so far followed the BICS 2007 version. The update comes as NUS-CRI evolves and updates its database and industry classification to be in line with a newer market standard. Table 1 below describes the two industry classification versions (NUS-CRI 2007 and NUS-CRI 2020):

<b><u>NUS-CRI 2007</u></b>	<b><u>NUS-CRI 2020</u></b>
Basic Materials	Communications
Communications	Consumer Discretionary
Consumer, Cyclical	Consumer Staples
Consumer, Non-Cyclical	Energy
Diversified	Financials
Energy	Real Estate
Financial	Health Care
Industrial	Industrials
Technology	Materials
Utilities	Technology
Miscellaneous	Utilities
	Miscellaneous

*Table 1: Details of NUS-CRI 2007 and NUS-CRI 2020 based on BICS 2007 and BICS 2020 Industry classification respectively*

NUS-CRI's 2007 industry classification is based on the BICS 2007 (BICS 2007 classifications of Asset backed securities<sup>2</sup>, Funds<sup>3</sup>, Government entities<sup>4</sup> and firms without a classification are grouped under Miscellaneous). Furthermore, NUS-CRI's 2020 industry classification is likewise based on the BICS 2020 classification (Miscellaneous classification now contains Unclassifiable firms<sup>5</sup>, Government entities and firms that do not have a classification).

Users can now aggregate individual PD values using either NUS-CRI 2007 or NUS-CRI 2020 version via the NUS-CRI website. In addition, mapping tables are available for both NUS-CRI 2007 and NUS-CRI

<sup>1</sup> In Addition to the PD and AS, all of NUS-CRI's other products, such as BuDA and CrISIFI, will also be updated using BICS 2020.

<sup>2</sup> Asset backed securities as per both BICS 2007 do not have any corporate entities.

<sup>3</sup> Entities that were classified as funds in BICS 2007 are either not classified or have been migrated to other sectors such as financials in BICS 2020. NUS-CRI excludes closed-end funds as defined by Bloomberg from our calculations.

<sup>4</sup> Majority of government entities under both BICS 2007 and BICS 2020 have exited the market and are no longer publicly listed companies. However, they have had active PD in the past and will therefore also be classified under the miscellaneous sector. An example of a firm that is still active and was classified under the government sector is Banco Latinoamericano de Comercio Exterior SA (Bladex), which is a multinational bank that finances foreign trade within Latin America and the Caribbean.

<sup>5</sup> Note: Firms without classification are different from Unclassifiable firms as described by BICS 2020. Unclassifiable firms are those for which Bloomberg does not have enough information available to determine business activity.

2020 for ease of applications for those who prefer the old classification system. However, the backend calculations involving the NUS-CRI PD and AS are all going to be based on NUS-CRI 2020 classification.

### **Special treatment of Real Estate firms**

For NUS-CRI PD calculations, firms are divided into financial and non-financial firms which are subject to different treatments. It is worth noting that real estate firms under BICS 2020 have been classified as non-financial firms instead of financial under BICS 2007. However, as the real estate sector (comprising real estate investment trusts (REITs)) has capital structure more in line with other financial firms, we group real estate firms to financial category in our backend calculations. Another rationale for treating them as financial firms reflects their limited availability of Current Ratio<sup>67</sup>, as such we continue to use Cash/Total Assets to measure real estate firms' liquidity like other financial firms.

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<sup>6</sup> Current ratio is the liquidity measure used in the NUS-CRI PD model for non-financial firms, whereas Cash/Total Assets is utilized for financial firms. Further details can be found in the NUS-CRI technical report (Version 2021, Update 1).

<sup>7</sup> Current Ratio is not widely available for real estate firms, especially those domiciled in the United States.