

Principles of Portfolio Analytics: Instrument Mapping

Methodology

S&P Global Sustainable1 – October 2024

Table of Contents

Introduction and Context	3
Data Sources and Collection	4
Methodology Overview.....	5
Monitoring and Review.....	11
Assumptions and Limitations	12
Significant Updates.....	13
Appendix	14
S&P Global Sustainable1 Disclaimer	17

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Introduction and Context

In the context of growing regulatory frameworks and voluntary reporting standards applicable to the financial sector, Sustainable1 (S1) Portfolio Analytics (PA) allows financial institutions to assess their investment portfolios against a range of climate, nature, and sustainability topics.

What is 'mapping' in the context of sustainability-related portfolio analysis?

Sustainability data and methodologies usually take an entity-level focus. In other words, the data used in ESG analyses is created at the company, country, physical asset, or project-level. For investors, there is therefore a need to map the financial securities held in a portfolio to an entity for which sustainability data has been, or can be, produced.

When sustainability portfolio assessments were first developed there was a primary focus on listed equity portfolios, with a straightforward process of mapping each security to its issuing company. As the market matured and demand for coverage of equity or debt issued by private corporates, or private subsidiaries of listed corporates, grew, there was a need to expand and enhance approaches to mapping. By bringing in corporate hierarchy data, S1 is able to trace responsibility and identify ultimate beneficiaries of the finance being raised. However, any approach to mapping must take into consideration questions such as the goal of the analysis being performed, the importance of disclosed versus modelled data, the importance of prioritizing a financed activity focus versus an ultimate beneficiary/responsible party focus, the coverage available from data providers, and more. These considerations are addressed in the sections below.

Data Sources and Collection

Security mapping for sustainability PA leverages data from a variety of sources, outlined in the table below.

Datapoint	Source	Use Case
Portfolio or index constituent IDs or Security IDs and holding date	Client	Provides the list of investments to be mapped and the reference date
Security Type	S&P Global Market Intelligence	Used for sorting and screening to determine whether an instrument is in/out of scope
Entity Type	S&P Global Market Intelligence	Determines whether an entity is in/out of scope
Issuer and Parent Company IDs across the corporate hierarchy	S&P Global Market Intelligence	Used to identify candidates for parent-subsidiary substitution
GICS Classification	S&P Global Market Intelligence	Facilitates business activity match-check across the corporate hierarchy GICS Level 4 used to determine feasibility of fully modelled coverage in the absence of fully researched data
Environmental Profile	S&P Global Sustainable1	Availability check for fully researched company profiles
Company Revenues (mUSD)	S&P Global Market Intelligence	Used to determine feasibility of fully modelled coverage in the absence of fully researched data
Country ISO Codes	S&P Global Market Intelligence	Input into mapping sovereign issuers to country environmental profile

Methodology Overview

To carry out a security mapping exercise as described below, the following inputs must be available:

1. Security or Issuer identifier (MI Key, Capital IQ (CIQ) ID, ISIN, CUISIP or SEDOL)
2. Issuer name
3. Holding date

Upon receipt the securities will be sorted and screened before being processed according to asset type and the mapping methodology selected.

SECURITY SORTING & SCREENING

The first step when processing a portfolio of securities is to sort and screen. Sorting involves grouping securities by the methodology you wish to apply. Methodologies typically differ by entity focus and as such need to be processed separately. For example, corporate equity, debt and loans will use sustainability data that is generated at the company-level, sovereign bonds will use data generated at the country-level, mortgages and real estate investments will use data generated at the building-level, and project finance will use data generated at the project-level.

The second step is to screen those securities that have been assigned to a given methodology in order to isolate those that are considered 'in scope'. For example, if performing analytics on corporate investees with the intention of calculating an investor's 'financed emissions', then the securities must represent a past or present source of finance that directly or indirectly benefitted the company in question. Equity, debt and loans would be considered in-scope. Shorts, options, swaps, CFDs and other derivatives would be considered out-of-scope. A full list of security types referenced by the methodology can be found in Table 1 of the appendix. Once screening is complete, the remaining 'in-scope' assets are re-weighted to ensure the total weight sums up to 100%. The importance of re-weighting assets after screening is detailed in the 'Principles of PA: Aggregation' methodology.

For private equity, real estate and project finance, the link from security to entity is a required input from the portfolio manager. For corporate equity, debt and loans or sovereign debt the linking can be performed by S1 and leverages security and corporate structure data from S&P Global Market Intelligence (MI). The security type labels available from MI, along with the 'in-scope' or 'out-of-scope' designations made by S1 are provided in the appendix. The approaches available for corporates and sovereigns are detailed separately below.

CORPORATE SECURITIES

There are six elements that feed into the S1 corporate security mapping methodology:

1. Parent-Subsidiary Substitution
2. Entity Type Screening
3. Full Research Prioritization
4. Anchor Dataset Availability
5. Business Activity Matching
6. Financials Exception

A description of each element is provided below, followed by the applicability of each element to existing delivery channels.

1. Parent-Subsidiary Substitution

The primary consideration when expanding analytics from listed equity portfolios to portfolios containing publicly traded bonds or syndicated loans is whether to allow for indirect mapping of securities to parent entities. The reason for this is that many bonds and loans are issued by private subsidiaries (with no sustainability data available) of larger listed parents (with sustainability data available).

Parent-subsidiary substitution refers to the concept of using a parent's sustainability profile in place of the issuer's when performing portfolio-level analysis. This may sometimes be described as the issuer 'inheriting' the sustainability profile of its parent, but it is more

accurate to view it as the mapped parent being chosen to represent the ultimate (or closest) beneficiary to the finance raised by the issuing entity. The alternative to parent-subsidary substitution is to limit the analysis to direct mapping only, meaning only each security's issuer may be included in a portfolio assessment.

Choosing whether to allow parent-subsidary substitution or restrict the analysis to direct mapping only will depend on the type of analysis being performed, and the goals and philosophy of the investor. Utilizing direct mapping only may provide a stronger link between the securities held and the activities being financed, however it is also likely to create a much higher dependency on modelling as well as lower overall coverage.

Parent companies, in particular listed parents, often publish consolidated financials that include the balance sheet statements of all subsidiaries. Likewise, carbon emissions published by such entities should cover the operations of all subsidiaries in which the parent has a controlling stake. If the goal of the analysis is to calculate the financed emissions of the investor, then using parent-subsidary substitution allows an investor to incorporate disclosures of the parent and calculate their financing contribution at the parent-level. This approach prioritizes disclosures over modelling and is therefore better equipped to capture real-world emissions changes over time. However, this is at the expense of allowing investors in low-carbon subsidiaries to report lower financed emissions in the short-term versus investors in high-carbon subsidiaries with the same parent (or the parent itself).

Availability of full corporate hierarchy data depends on the level of access built into the tools used when generating portfolio analyses. Basic access provides a 'Partial Hierarchy' that is limited to a maximum of 3 tiers – Issuer, Immediate Parent and Ultimate Parent – whereas tools leveraging the full hierarchy have no limit on the number of tiers available. See the table below for an example of the companies a security may be mapped to when deploying parent-subsidary substitution with Full Hierarchy, Partial Hierarchy or direct-only mapping.

Example	Full Hierarchy	Partial Hierarchy	Direct Only
Viterra Finance B.V.	Issuer	Issuer	Issuer
Viterra B.V.	Parent 1	Immediate Parent	-
Viterra Limited	Parent 2	-	-
Danelo Limited	Parent 3	-	-
Glencore plc	Parent 4	Ultimate Parent	-

Only companies that have a majority stake (>50%) are considered parents within the corporate hierarchy used by S1 in the mapping methodology.

2. Entity type screening:

Once a decision to use parent-subsidary substitution has been made, the next step is to exclude any entity types within the hierarchy which are not 'in-scope'. This means excluding parents, or more often ultimate parents, that are not corporate entities, typically this includes government institutions, religious institutions and trade associations. The table below provides an example hierarchy in which the ultimate parent would be excluded due to its entity type.

Example	Hierarchy	Entity Type	In-Scope
Motiva Enterprises LLC	Issuer	Private Company	✓
Saudi Refining, Inc.	Parent 1	Private Company	✓
Aramco Services Company, Inc.	Parent 2	Private Company	✓
Saudi Arabian Oil Company	Parent 3	Public Company	✓
Saudi Arabia	Parent 4	Government Institution	✗

For a full list of entity types and their categorization please refer to Table 2 of the appendix.

3. Full Research Prioritization

The third step when setting the mapping methodology relates to whether a company's research status should be prioritized above proximity to the issuer. A 'Fully Researched' status indicates that a company is a part of S1's maintained universe and has therefore been subjected to a four-step research process including business segment mapping, multi-sector impact modelling, incorporation of data disclosures and company engagement before publication. A full description of this research process can be found [here](#).

For companies in a hierarchy that are not a part of the maintained universe it may still be possible to estimate certain sustainability criteria (such as carbon footprint, carbon earnings at risk and physical risk) using supplementary data either from MI, or from the portfolio manager directly. For example, a company's carbon profile can be estimated using revenue and primary sector data from MI along with the '[GICS Sector GHG Average Dataset](#)' from S1.

As with the parent-subsidary substitution, the decision of whether or not to enable full research status prioritization will depend on the investor's use case and aim of the analysis being undertaken. 'Fully Researched' companies should be prioritized if using high-quality estimates and disclosures is important, or if comparing intra-sector performance of investees. Alternatively, disabling full research prioritization may be more suitable if creating an emissions profile for the entity closest in the hierarchy to the issuer is of high importance. The table below indicates the order in which companies within a hierarchy may be prioritized depending on whether full research prioritization is enabled or disabled. The table in the "Application of Mapping Rules Across S1 Delivery Channels" section outlines when this is enabled across the delivery channels.

Full Hierarchy	Research Status	Modelling Available	Priority Order	
			Enabled	Disabled
Issuer	Not Researched	No	-	-
Parent 1	Not Researched	Yes	3	1
Parent 2	Fully Researched	Yes	1	2
Parent 3	Fully Researched	Yes	2	3
Parent 4	Not Researched	Yes	4	4

4. Anchor Dataset Availability

An anchor dataset refers to the primary data used when assessing data availability while stepping through a corporate hierarchy. Not all sustainability data is generated with the same cadence, furthermore some datasets may be used primarily for risk analysis while others facilitate impact assessments. The anchor dataset selected will determine which company a security may be mapped to, so should reflect the primary goal of the analysis being performed. The default anchor dataset for all S1 portfolio analyses is [carbon emissions data](#).

Availability of emissions data is determined using a three-year look-back period, starting from the portfolio's holding date, in order to make allowances for lags in disclosure. For fully researched profiles this lag refers to data availability within the Trucost Environmental Register. For fully modelled companies this lag refers to revenue data availability. The table below provides an example of what data is viable for use when mapping through a corporate hierarchy based on a given holding date.

Analysis Date:	01/08/2024
Holding Date:	31/03/2023
Permitted Lag:	3 Years
Cut-Off:	31/03/2020

Company Year-End	Data Available	Can Use?	Data Selected
31/12/2024	✗	-	-
31/12/2023	✓	✗	✗
31/12/2022	✓	✓	✓
31/12/2021	✓	✓	✗
31/12/2020	✓	✓	✗
31/12/2019	✓	✗	✗

5. Business Activity Matching

As mentioned above, by mapping a security up through a corporate hierarchy, there is a possibility of selecting a company with business activities divergent from the issuer. If a priority for the investor is the use of emissions data based on business activities most closely matching that of the issuer, then a business activity matching condition may be enabled. S1 utilizes the GICS classification system to determine business activity matching.

Setting matching requirements at GICS Level1 (Sector) may be too broad, with the activities within a sector being too varied to be considered a good proxy for business activity matching. Conversely, setting matching requirements at GICS Level 4 (Sub-Industry) may be considered too punitive a requirement with parent-subsidary being disallowed, despite quite similar business activities. When enabling business activity matching as a requirement, S1 therefore opts for GICS Level 2 (Industry Group) in order to strike a balance between the two options. Once enabled, only entities in the hierarchy with a GICS Level 2 matching that of the issuer are viable for parent-subsidary substitution, as illustrated in the table below.

Example	Hierarchy	GICS Level 1	GICS Level 2	In-Scope
Abertis Infraestructuras, S.A.	Issuer	Industrials	Transportation	✓
Abertis Holdco SA	Parent 1	Industrials	Capital Goods	✗
Mundys S.p.A.	Parent 2	Industrials	Transportation	✓
Schema Alfa S.P.A	Parent 3	Industrials	Transportation	✓
Edizione S.p.A.	Parent 4	Financials	Financial Services	✗

By enabling this condition, a focus on the probable activities being financed is being prioritized above coverage, high-quality estimates, and disclosures. It will also prevent the use of data for conglomerates being used as a proxy for the sustainability characteristics of its constituent businesses.

6. Financials Exception

The final mapping rule that may be deployed by S1 relates to the treatment of securities issued by entities with the 'Financials' (GICS Level 1) sector designation. A common practice within corporate finance is for private subsidiaries or Special Purpose Vehicles (SPVs) to be setup with a primary objective being to issue debt on behalf of the parent entity. This approach to debt issuance may be for legal or financial risk management reasons, however, by enabling the business activity matching requirement detailed above, debt issued by such entities would not be mapped to the parent. Furthermore, fully modelled carbon profiles may be generated based on financial sector emissions factors rather than that of the parent. Private subsidiaries may also be used to provide finance to consumers with the sole purpose of purchasing the goods produced by the parent. As with SPVs, debt issued by these entities would also not be mapped to the benefitting parent when enabling the business activity matching requirement without also enabling a financials exception rule.

The financials exception rule is applied by excluding companies within a hierarchy with the GICS Level 1 'Financials' designation, providing one or more entities in the hierarchy are non-Financials, as illustrated in the table below.

Example	Hierarchy	GICS Level 1	GICS Level 2	In-Scope
Volkswagen Financial Services N.V.	Issuer	Financials	Financial Services	✗
Volkswagen Finance Overseas B.V.	Parent 1	Financials	Financial Services	✗
Volkswagen Financial Services O.A.	Parent 2	Financials	Financial Services	✗
Volkswagen AG	Parent 3	Cons. Discretionary	Autos and Components	✓
Porsche Automobil Holding SE	Parent 4	Cons. Discretionary	Autos and Components	✓

When used in conjunction with the business activity matching requirement, the GICS Level 2 match rule begins from the first entity in the hierarchy that is not in the GICS Level 1 Financials sector, per the example below.

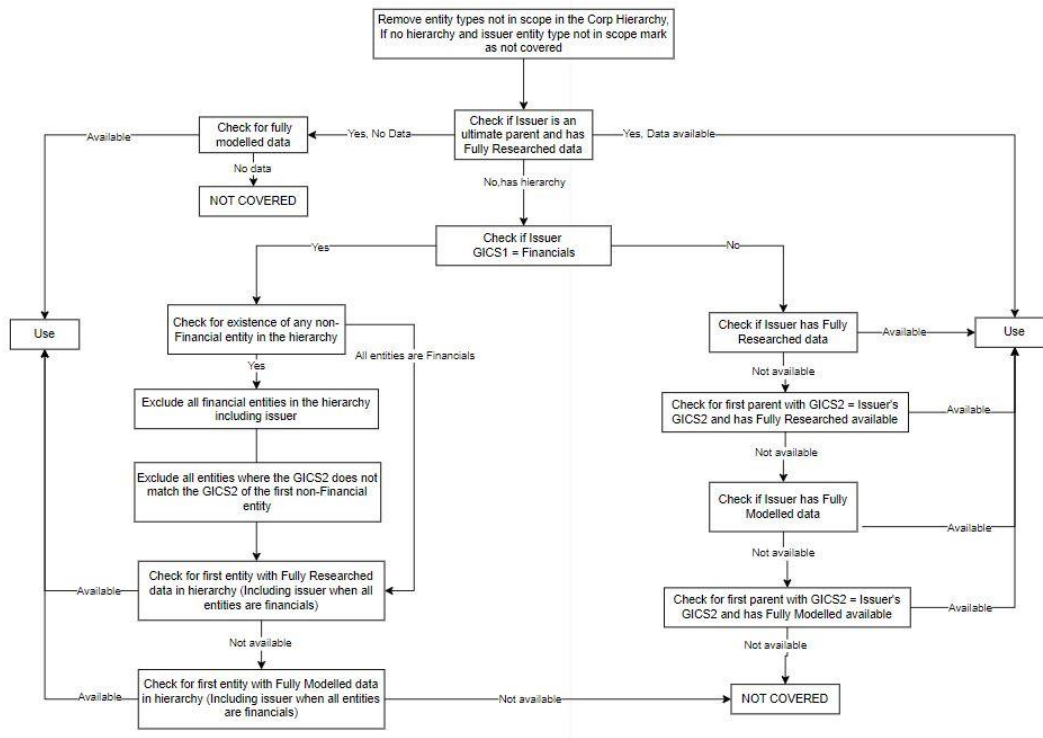
Example	Hierarchy	GICS Level 1	GICS Level 2	In-Scope
Viterra Finance B.V.	Issuer	Financials	Financial Services	✗
Viterra B.V.	Parent 1	Consumer Staples	Consumer Staples Dist..	✓
Viterra Limited	Parent 2	Consumer Staples	Consumer Staples Dist..	✓
Danelo Limited	Parent 3	Real Estate	Real Estate Management..	✗
Glencore plc	Parent 4	Materials	Materials	✗

If all entities in the hierarchy sit within the Financials sector, then none are excluded from the mapping exercise, per the example below.

Example	Hierarchy	GICS Level 1	GICS Level 2	In-Scope
Protective Life Insurance Company	Parent 1	Financials	Insurance	✓
Protective Life Corporation	Parent 2	Financials	Insurance	✓
Dai-ichi Life International Holdings	Parent 3	Financials	Insurance	✓
Dai-ichi Life Holdings, Inc.	Parent 4	Financials	Insurance	✓

Figure 1 below provides an illustration of the decision tree that would be applied when implementing all six of the methodology elements described above.

Figure 1: Mapping logic implementation decision tree



Application of Mapping Rules Across S1 Delivery Channels

The table below provides a summary of which mapping methodology rules are implemented or available via each S&P Global delivery channel that provides portfolio-level or index-level products and services.

	Services (Default)	Services (Bespoke)	CIQ Pro PA	DJI FI Indices
1 Parent-Subsidiary Substitution	Yes (Partial Hierarchy)	Yes (Partial Hierarchy) or No (Direct Only)	Yes (Partial Hierarchy)	Yes (Full Hierarchy)
2 Entity Type Screening	Yes	Yes	Yes	Yes
3 Full Research Prioritization	Yes*	Yes* or No	Yes*	Yes
4 Anchor Dataset Availability	Yes	Yes	Yes	Yes

5 Business Activity Matching	No	Yes or No	No	Yes
6 Financials Exception	No	Yes or No	No	Yes

**Mapping solutions created before the 'Fully Researched' flag being made available use the 'Public corporation' entity type flag from CIQPro as a proxy for 'Fully Researched'.*

SOVEREIGN SECURITIES

Sovereign securities will be identified and isolated during the sorting phase, before being processed with S1's Sovereign PA Analytics. At present, this analysis is only available via the Sustainability Services delivery channel. As with equity and debt mapping to corporate-level data in the Trucost Environmental Register, sovereign and related bonds will be mapped to country-level data in the S1 Sovereign Environmental dataset.

In the default approach for S1 Sovereign PA, debt issued by the following entity types are mapped, via the ISO, to the corresponding sovereign:

- National government
- National government agency
- Sub-national government
- Sub-national government agency
- State-owned corporations

Issuers not covered in the default approach include:

- Supranational Agency

Debt issued by state-owned corporations may also be analyzed under the corporate-focused sustainability analytics if data is available.

Monitoring and Review

Data input sources and data quality reviews are periodically undertaken with the aim of ensuring the most accurate possible outcomes of the methodologies being applied. For mapping carried out by the S1 Services team, gaps and omissions such as those caused by non-recognition of ISINs by CIQ Pro may be flagged to the data provider and treated manually so as to ensure the highest-possible portfolio coverage. For scheduled mappings, mapping changes from one delivery to the next are flagged in order to facilitate sense-checking and review by downstream users.

Feedback channels from downstream mapping users, in particular S1 Services, CIQ Pro PA and Dow Jones Indices, have been established to facilitate troubleshooting and/or methodology review should use-cases change. Periodic reviews of external market trends are also undertaken in order to remain aligned with 'best-practice' approaches to security mapping for sustainability analytics.

All new methodologies and any material changes to existing methodologies are reviewed and approved by an independent methodology governance committee.

Assumptions and Limitations

The approach selected by a user when mapping corporate securities has potentially significant implications for portfolio-level results: For example, mapping a bond issued by a private clean energy subsidiary (with no disclosures) to its fossil fuel-focused power producing parent (with disclosures) would increase the quality of data used, but also significantly increase the total financed emissions considered. Conversely, mapping debt issued by a private coal mining subsidiary (with no disclosures) to its diversified conglomerate parent (with disclosures) would again increase the quality of the data used but decrease the total financed emissions considered. Prioritizing data quality better equips users to understand real-world changes over time and perform peer comparisons, but the trade-off, as described above, may mean a less granular activity-based view.

The use of an anchor dataset such as carbon will help to ensure the best possible coverage for financed emissions analysis, however it may impact the applicability of supplementary analyses performed using the same mapping output. For example, utilizing an ultimate parent's emissions profile may make sense from a responsibility perspective, but the company's ESG score or physical risk profile may be less directly relevant to the investor.

The mapping methodology takes a pragmatic approach to data availability. For example, at present there is no point-in-time corporate hierarchy available for use by the extant mapping tools. For historical footprints, present day hierarchies are used as proxies for past linkages. There will also be exceptions not yet captured within the methodology described above. In certain jurisdictions for example, there may be entities that issue debt on behalf of other beneficiaries that are not directly linked in the MI corporate hierarchy dataset.

Tradable funds or collateralized securities with obligations from multiple underlying entities are not currently covered in this mapping methodology, unless the full look-through is available.

Significant Updates

Both default and optional mapping methodologies will periodically be updated. Changes may reflect updates made across all delivery channels due to core methodology updates, or may reflect changes for a single delivery channel, for example due to data availability changes.

The table below provides a summary of all changes made since first publication.

Month/Year of Enhancement	Enhancement Description	Expected Impact
10/2024	Initial version	N.A.

Appendix

The following table lists out the security types and their respective classifications as used in the methodology.

Table 1 – Corporate Security Types

Security Type	Category	In-Scope
Agency Bond	Other	Yes
Agency Convertible	Other	Yes
Agency Note	Other	Yes
Asset Backed Security	Other	No
Bond/Note	Corporate Debt	Yes
Brady Bonds	Unknown	Yes
Bulldog	Unknown	Yes
Canadian Treasury Bill	Other	No
Canadian Treasury Bond	Other	No
Capital Lease	Unknown	No
Certificate of Deposit	Unknown	No
Collateralized Loan Obligation	Other	No
Collateralized Mortgage Obligation	Other	No
Common Equity	Corporate Equity	Yes
Corporate Bank Note	Corporate Debt	Yes
Corporate Bond	Corporate Debt	Yes
Corporate Certificate	Other	Yes
Corporate Convertible	Corporate Debt	Yes
Corporate Debentures	Corporate Debt	Yes
Corporate Inflation Indexed	Corporate Debt	Yes
Corporate Insured Debenture	Corporate Debt	Yes
Corporate LOC Backed	Corporate Debt	Yes
Corporate Money Market Instrument	Other	No
Corporate MTN	Corporate Debt	Yes
Corporate MTN Zero	Corporate Debt	Yes
Corporate Note	Corporate Debt	Yes
Corporate Paper	Corporate Debt	Yes
Corporate Pass Thru Trt	Corporate Debt	Yes
Corporate PIK Bond	Corporate Debt	Yes
Corporate Strip	Corporate Debt	Yes
Corporate Sukuk	Other	Yes
Corporate UIT	Corporate Debt	Yes
Corporate Zero	Corporate Debt	Yes
Country Bond	Unknown	No
Depository Receipt	Corporate Equity	Yes

Euro MTN	Corporate Debt	Yes
Eurobond	Corporate Debt	Yes
Foreign Currency Debenture	Corporate Debt	Yes
Foreign Government Strip	Other	No
Foreign Governments and Agencies	Other	Yes
Foreign Index-Linked	Corporate Debt	Yes
Government Bond	Other	No
Inflation Indexed Security	Corporate Debt	Yes
Mezzanine	Corporate Debt	Yes
Mortgage Bonds	Other	No
Mortgage Notes	Other	No
Municipal	Other	No
On-The-Run 10-Year Canadian Treasury	Other	No
On-The-Run 10-Year Treasury	Other	No
On-The-Run 13-Week Treasury	Other	No
On-The-Run 1-Year Canadian Treasury	Other	No
On-The-Run 26-Week Treasury	Other	No
On-The-Run 2-Year Canadian Treasury	Other	No
On-The-Run 2-Year Treasury	Other	No
On-The-Run 30-Year Canadian Treasury	Other	No
On-The-Run 30-Year Treasury	Other	No
On-The-Run 3-Month Canadian Treasury	Other	No
On-The-Run 3-Year Treasury	Other	No
On-The-Run 4-Week Treasury	Other	No
On-The-Run 52-Week Treasury	Other	No
On-The-Run 5-Year Canadian Treasury	Other	No
On-The-Run 5-Year Treasury	Other	No
On-The-Run 6-Month Canadian Treasury	Other	No
Operating Lease	Other	No
Operating Partnership Units	Corporate Equity	Yes
Other	Unknown	Yes
Other Borrowings	Unknown	Yes
Preferred Security	Corporate Debt	Yes
Preferred Stock	Corporate Debt	Yes
Retail Note	Corporate Debt	Yes
Reverse Convertible Security	Corporate Debt	Yes
Samurai	Corporate Debt	Yes
Securities Loaned	Unknown	Yes
Securities Sold Under Agreement to Repurchase	Unknown	Yes
Shogun	Corporate Debt	Yes
Sovereign Bond	Other	No
Sovereign Note	Other	No

Term Loan	Corporate Debt	Yes
Toggle Notes	Corporate Debt	Yes
Trust Preferred Capital Security	Corporate Debt	Yes
US Agency Debenture	Other	No
US Agency Discount Notes	Other	No
US Agency MTN	Other	No
US Agency Retail Note	Other	No
US Agency Strips/Zero	Other	No
US Government Bill	Other	No
US Government Bond	Other	No
US Government Note	Other	No
US Government Strips - Interest	Other	No
US Government Strips - Principal	Other	No
US Government Trust Certificate	Other	No
Yankee	Other	Yes

Table 2 – Corporate Entity Types

The following table lists out the entity types and their respective classifications as used in the methodology.

Entity Type	Category	In-Scope
Arts Institution	Public	Yes
Assets/Products	Other	No
Corporate Investment Arm	Public	Yes
Educational Institution	Public	Yes
Financial Service Investment Arm	Public	Yes
Foundation/Charitable Institution	Public	Yes
Government Institution	Other	No
Private Company	Private	Yes
Private Fund	Private	Yes
Private Investment Firm	Private	Yes
Public Company	Public	Yes
Public Fund	Public	Yes
Public Investment Firm	Public	Yes
Religious Institution	Private	No
Trade Association	Private	No

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