Moody's Default & Recovery Database (DRD) has data for 500,000+ debts and 50,000+ global corporate and sovereign entities, including rating, default, and recovery history. Coverage includes (Moody’s Investors Service) rated entities, rated defaulters, and unrated defaulters back to 1980 for EMEA, 1920 for the US, and the 1990’s for Asia. Sector coverage includes Corporates, Sovereigns, Sub-Sovereigns (outside of the U.S.), Financial Institutions, Insurance companies, and REITs. Other Broad industries such as Project Finance, Structured Finance, and Municipals are not included.

Moody’s Investors Service (“MIS”, the rating agency) uses DRD’s issuer, default, and recovery data as the starting point to produce default research that is heavily used by market participants globally.

The Default & Recovery Database is part of Moody’s Analytics’ broader suite of default products. This database includes the Default & Ratings Analytics web platform to give users access to easy to use, customizable web-based tools to quickly calculate rating transition matrices and default rates based on the DRD data.

This document will help you understand what is in the Default & Recovery Database and start using it to create your own analyses.
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Introduction to the DRD

The DRD contains four main sets of data: Issuer/Issue, Default, Ratings, and Ultimate Recovery data. All of this data is organized into 27 tables that have primary keys built into them to enable users to build relationships between tables and perform complex queries. Universal identifiers facilitate the use of external data sources, and the **Lookup Table** holds definitions for any field ending with "\_cd". The DRD is available for download via ‘flat file’ and Microsoft Access on [www.moodys.com](http://www.moodys.com), as well as via FTP.

<table>
<thead>
<tr>
<th>Issuer &amp; Issue</th>
<th>Default</th>
<th>Ratings</th>
<th>Ultimate Recovery</th>
<th>Additional Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>Master Issuer</td>
<td>Master Default</td>
<td>Senior Rating Standard</td>
<td>Recovery Event</td>
<td>Backup Collateral</td>
</tr>
<tr>
<td>Government Domain</td>
<td>Default History</td>
<td>Senior Rating Loan Only</td>
<td>Recovery Obligor</td>
<td></td>
</tr>
<tr>
<td>Issuer Identifiers</td>
<td>Default Recovery Debt*</td>
<td>Senior Rating Bond Only</td>
<td>Recovery Class</td>
<td></td>
</tr>
<tr>
<td>Family Structure</td>
<td>Senior Default Bond Only*</td>
<td>Issuer Watchlist</td>
<td>Recovery Class Instrument*</td>
<td></td>
</tr>
<tr>
<td>Debt Identifiers*</td>
<td>Senior Default Loan Only*</td>
<td>Outlook</td>
<td>Default Rating Instrument*</td>
<td></td>
</tr>
<tr>
<td>Master Issue*</td>
<td>Senior Default Standard*</td>
<td>Watch Outlook History</td>
<td>Debt Rating Instrument</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Debt Watchlist*</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

*Indicates issue-level data

The **Issuer/Issue** level information includes industry, region, and debt specific facts such as maturity date, sale date, coupon rate, etc. External identifiers such as CUSIPs and ISINs are included, allowing for connection to external databases.

The **Default** data includes details on global defaults, including the date of default and worldwide recovery prices (where available). This data is used as the basis for the Monthly Default Report and Annual Default Studies, however these reports cannot be replicated, as they include non-public information. The DRD data is worldwide and includes 30 day post-default trading prices, which is the price the aforementioned studies use to calculate recovery rates.

The **Ratings** tables provide details on both issue-level and issuer-level ratings. The issuer-level rating is the Senior Unsecured or Equivalent Rating, which is what is used in our default research. These tables are the starting point for many of our published default rates and transition matrices. Please click here for a paper discussing the [Senior Unsecured or Equivalent Rating](http://www.moodys.com), and here for the Algorithm.

The **Ultimate Recovery** piece covers large public US corporate defaults, and includes the final recovery based on what debt holders were actually repaid, available both nominally and discounted for lost
interest. This data is based on in-depth research conducted using bankruptcy filings, 10k’s, 10q’s, and press releases.

The remaining tables provide additional reference information to help you understand the data in the other tables.

**MASTER ISSUER & ISSUE DATA**

The **Master Issuer Table** provides descriptive details on each issuer in the data set, regardless of default status, and regardless if they were ever rated by Moody’s or not. It includes information on the company name, industry, and domicile. The **Master Issuer Number** is a unique identifier to the DRD; it is one of the primary ways you can link data between the various tables. The **Moody’s Domain Number** provides a code that indicates the primary country where this entity conducts its business (as defined by Moody’s); this code can be translated by using the **Government Domain Table**. The **Master Issuer Table** also contains 7 industry code types, including 4 Moody’s codes. **Moody’s 11** is the least granular industry grouping, and is based on **Moody’s 35**. **Moody’s 35** and **Moody’s Broad Codes** are both mapped to specific codes. **Moody’s Specific** is the most granular of these Moody’s codes, and is loosely based on the industries found on the top right of Moodys.com issuer pages. This table also includes **SIC Broad** and **SIC Specific Codes**, as well as **NAICs Codes**; these are useful, but coverage may be limited.

As a starting point you may want to use **Moody’s 35**, which are the codes most often used in our default research. [For a description of Moody’s 35 codes, please click here](#). Please note that not all issuers will have an industry code assigned, especially historically and for unrated names.

The **Master Debt Table** (formerly Master Issue Table) stores descriptive details of each debt issue in the dataset including **Debt Type**, **Coupon Rate**, and **Maturity**. Similar to the Master issuer table, this table includes all issues regardless of default or Moody’s rating status. The **Master Issuer Number** allows you to link between the **Master Issuer** and the **Master Debt Table**. One of the key fields in this table is the **Debt Class Code**, used by the Default Research analysts to identify bonds versus loans based on the below mapping:

<table>
<thead>
<tr>
<th>Debt Class Code</th>
<th>Translation</th>
<th>Type of Debt</th>
</tr>
</thead>
<tbody>
<tr>
<td>BL</td>
<td>Bank Loan</td>
<td>Loan</td>
</tr>
<tr>
<td>BCF</td>
<td>Bank Credit Facility</td>
<td>Loan</td>
</tr>
<tr>
<td>SOVBL-FC</td>
<td>Sovereign Bank Loan, Foreign Currency</td>
<td>Loan</td>
</tr>
<tr>
<td>SOVBL-LC</td>
<td>Sovereign Bank Loan, Local Currency</td>
<td>Loan</td>
</tr>
<tr>
<td>LTPD</td>
<td>Long Term Public Debt</td>
<td>Bond</td>
</tr>
<tr>
<td>MUNI</td>
<td>Municipal Bonds</td>
<td>Bond</td>
</tr>
<tr>
<td>REG</td>
<td>Regular Bonds</td>
<td>Bond</td>
</tr>
<tr>
<td>SOVLTPD-FC</td>
<td>Sovereign Long Term Public Debt, Foreign Currency</td>
<td>Bond</td>
</tr>
<tr>
<td>SOVLTPD-LC</td>
<td>Sovereign Long Term Public Debt, Local Currency</td>
<td>Bond</td>
</tr>
<tr>
<td>Debt Class Code</td>
<td>Debt Class Description</td>
<td>Description</td>
</tr>
<tr>
<td>-----------------</td>
<td>------------------------</td>
<td>-------------</td>
</tr>
<tr>
<td>CON</td>
<td>Convertible/Exchange/Debenture</td>
<td>A bond that can be exchanged into equity of the company.</td>
</tr>
<tr>
<td>CP</td>
<td>Commercial Paper</td>
<td>A short term obligation that is issued usually for financing/liquidity purposes.</td>
</tr>
<tr>
<td>EQT</td>
<td>Equipment Trust</td>
<td>A debt obligation that is backed by a physical asset/equipment — for example an underlying airplane.</td>
</tr>
<tr>
<td>FMB</td>
<td>First Mortgage Bond</td>
<td>A debt obligation that is backed by an underlying mortgage.</td>
</tr>
<tr>
<td>IRB</td>
<td>Industrial Revenue Bond</td>
<td>A debt obligation that will be repaid using revenue from a particular project that it funded.</td>
</tr>
<tr>
<td>PAS</td>
<td>Pass-Through Certificate</td>
<td>Backed by an underlying pool of asset that &quot;pass&quot; through money as it is generated to pay off the debt.</td>
</tr>
<tr>
<td>PFS/PRF</td>
<td>Preferred Stock</td>
<td>A piece of equity that usually pays a dividend and is higher that common stock.</td>
</tr>
<tr>
<td>REG</td>
<td>Regular Bond</td>
<td>A regular bond with no special features or hybrid characteristics.</td>
</tr>
<tr>
<td>SLB</td>
<td>Secured Lease Obligation Bond</td>
<td>A debt obligation that is backed by an underlying lease.</td>
</tr>
<tr>
<td>SPN</td>
<td>Surplus Notes</td>
<td>Are subordinated bonds that are issued by an insurance company.</td>
</tr>
</tbody>
</table>

**Example:** Let’s look at Blockbuster, whose Master Issuer number is 4061. If we filter by Blockbuster in the Master Issuer table, we can see that Blockbuster is in the Retail & Distribution industry, with a Domain Number of 145. If we look that number up in the Government Domain table, we will see that it corresponds to the United States.

In the Master Debt Table, we can look up 4061 under the Master Issuer Number field. We can see all the debt that Blockbuster has issued, including information about the maturity, coupon rate, etc.
DEFAULT DATA

There are six key Default tables – the **Master Default**, the **Default Recovery Debt**, the **Default History**, the **Senior Default Bond Only**, the **Senior Default Loan Only**, and the **Senior Default Standard** tables. Defaults are entered into the database and classified based on Moody’s definition of default. Moody’s definition of default is applicable only to debt or debt-like obligations (e.g. swap agreements). We do not track technical defaults in this database.

Four events constitute a debt default under Moody’s definition:

a. A missed or delayed disbursement of a contractually-obligated interest or principal payment (excluding missed payments cured within a contractually allowed grace period), as defined in credit agreements and indentures;

b. a bankruptcy filing or legal receivership by the debt issuer or obligor that will likely cause a miss or delay in future contractually-obligated debt service payments;

c. a distressed exchange whereby 1) an obligor offers creditors a new or restructured debt, or a new package of securities, cash or assets that amount to a diminished financial obligation relative to the original obligation and 2) the exchange has the effect of allowing the obligor to avoid a bankruptcy or payment default in the future;

d. a change in the payment terms of a credit agreement or indenture imposed by the sovereign that results in a diminished financial obligation, such as a forced currency re-denomination (imposed by the debtor, himself, or his sovereign) or a forced change in some other aspect of the original promise, such as indexation or maturity.

Please note that this definition is subject to revision by Moody’s Investors Service without notice. Please click here for a white paper on Moody’s glossary of definitions, including our definition of default.

The six main default tables can be linked to each other and to the **Master Issuer** and **Master Debt** tables using the unique identifiers discussed above: the **Master Issuer Number**, the **Master Debt Number**, and the **Default Number**. Please see the graphic below to visualize these connections.
The **Master Default Table** stores details of each issuer’s *periods* of default (not every instance of a default event). A period of default could include multiple default events. For example, an issuer may miss several bond payments on different dates in a month; these are separate default events, but constitute only one period of default. This period would only appear once in the **Master Default Table**. For a history of individual credit events during a period of default, please see the **Default History Table**.

The **Master Default Table** includes major milestones, including the initial default event, bankruptcy date, and resolution date, if any. The **Master Issuer Number** again appears in this table, as it is an issuer-level set of data. The **Default Number** is introduced in this table; this field is a unique identifier for each default period recorded by Moody’s. Please note that if a company recovers from a default (per Moody’s definition), and then reenters default at a later period, both will be listed in this table but under different **Default Numbers**. The **Default Type** will provide a brief description of the default, such as “Missed Interest Payment”, “Chapter 11”, or “Distressed Exchange”. The **Rating Agency Default Date** is the date on which Moody’s considers this issuer to have entered default. It is possible for defaults and resolutions to occur on the same day; this is quite common for distressed exchanges. The resolution date can also be blank. We can use both the **Master Issuer Number** and the **Default Number** to map to other tables in the DRD.

The **Default Recovery Debt Table** provides information on all known outstanding debt issues for each issuer at the initial time of default for each **Default Number**. This table does not have information on the type of default; it simply provides details on the issues, both defaulted and non-defaulted, that were outstanding at the time of the issuer’s default. Just as a company can appear twice in the **Master Default Table** if it recovers from a default (per Moody’s definition) and then reenters default at a later period, so too can that issuer’s debt appear twice under different **Default Numbers**. If a debt is involved in two defaults simultaneously, e.g. for both an issuer and a guarantor, this will trigger a flag of “1” for one row in the Is **Duplicate Debt** column. Please remove debts with a flag of “1” for your analysis, unless you have a specific reason not to do so.

The **Default Price** column contains the trading price of defaulted debt expressed as a percentage of par. For distressed exchanges, this is the price on the day of the exchange. For all others, this is the price 30 days post-default (or if unavailable, between 20 and 40 days post-default). However, these instruments can often be quite illiquid and may not have prices available. Blank prices should not be considered zeroes. Moody’s sources this data externally and makes no adjustments. This is the column used to calculate the recovery rates in the majority of our default research.

This piece of recovery data is separate from the ultimate recovery data housed in the **Recovery Tables** of the database. Please see the section entitled “Ultimate Recovery” for more information.

Issues that actually defaulted will show their specific date of default in the **Default Debt Date** field. If there is no date in that field, then that specific issue did not default during that period.

**Example**: Let’s look at the example of Chesapeake Energy Corporation as shown in the screenshot below. If we look in the Master Default Table and search for 8786 in the Master Issuer Number, we will get two periods of default: one starting in December of 1998 with a Default Number of 5857, and one starting in December of 2015 with a Default Number of 46396. Following Default Number 46396, we can see in the Default History table that there were several incidents surrounding the main distressed exchange, including...
announcements. Looking at this Default Number in the Default Recovery Debt table, we can see all of the issues that were outstanding as of the Rating Agency Default Date time. Based on the fact that the Default Debt Date is populated for these issues, we can see that these all defaulted and can also see their associated default prices.

As described above, the Default History Table provides details about each default event during a given period of default. Each default event is assigned a Default History Number, and can be grouped using the Default Numbers discussed above. It includes both a short and long description of the defaults (if available), as well as dates associated with it. This table can be useful in understanding the details around specific defaults, but please be aware that most calculations are based on default periods and not default events.

The Senior Default Standard table stores the issuer level default events for issuers of long term debt. Information in this table is specifically formatted and filtered for default rate calculations. Each Master Issuer Number in this table has an associated Default Date as well as a Cohort Re-entry Date for use in default rate calculations. A cohort, as it relates to default rates, is the group of obligors that make up the sample size. When calculating a default or transition rate, an obligor cannot be in default. The Cohort Re-entry Date is therefore the date at which an obligor is eligible for inclusion in cohort creation after it defaulted, i.e. the date at which it is no longer considered in default.

Both the Senior Default Bond Only and Senior Default Loan Only tables also store issuer level default events, but based only on the bonds or loans that an issuer has outstanding, respectively.
RATINGS DATA

Most rating data in the DRD is contained in the tables that begin with "SENR_RATG_", with individual debt ratings found in the Debt Rating Table. All ratings in the top three Senior Ratings Tables are Senior Unsecured or Equivalent ratings, which identify the senior unsecured risk for an issuer based on the underlying debt structure. This is the rating used in the majority of our default research. For additional information on this issuer rating, please refer to the Senior Unsecured or Equivalent methodology located at this link.

The table below outlines the categories of ratings available in the database. This database does not contain the bank financial strength ratings.

<table>
<thead>
<tr>
<th>Table</th>
<th>Rating Type</th>
</tr>
</thead>
<tbody>
<tr>
<td>Senior Rating Standard</td>
<td>Issuer-level rating. This is the Senior Unsecured or Equivalent, based on the full debt structure of the company. This table is the most frequently used table.</td>
</tr>
<tr>
<td>Senior Rating Loan Only</td>
<td>Issuer-level rating. This is the Senior Unsecured or Equivalent, based on only the loans outstanding within the debt structure of the company.</td>
</tr>
<tr>
<td>Senior Rating Bond Only</td>
<td>Issuer-level rating. This is the Senior Unsecured or Equivalent, based on only the bonds outstanding within the debt structure of the company.</td>
</tr>
<tr>
<td>Debt Ratings</td>
<td>Issue-level rating, contains long term and short term rating types.</td>
</tr>
</tbody>
</table>

In order to qualify for a Senior Unsecured rating, the issuer needs to currently have certain meta characteristics and eligible rated debt history. These characteristics will rarely change (e.g. industry or type of company), but when they do, the issuer may no longer qualify for this type of rating at all. In these situations, the rating history will appear or disappear, from month over month, as the underlying data is updated. However, these changes do not materially impact the default, transition, or recovery calculations described in Moody's default research studies.

Example: If there is a given entity classified as a finance company (with qualifying debt), it will have a Senior Unsecured or Equivalent Rating. However, if that company acquires several other companies, and moves operations and assets out, it may be re-categorized as a holding company. Holding companies do not qualify for Senior Unsecured Ratings (subject to change without notice). In this case that same entity would no longer qualify for a Senior Unsecured or Equivalent rating and would be removed entirely, including its history. This entity would then no longer be included in our default research, default rates, rating transitions, nor Default & Recovery Database rating history.

Because the Rating Standard, Loan Only and Bond Only tables are issuer-level tables, they are organized around the Master Issuer Number. You can see the start / expiration of the rating using the Rating Date Time and the Rating Expiration Date. If you search for a specific issuer, each rating change will be included as a separate row within the database, as you can see from Ford's rating history below.
Outlook contains the historical issuer outlooks. These tables can all be joined to the Master Issuer Table using the Master Issuer Number. Issuer Watchlist contains the issuer-level watchlist information. The Watch and Outlook History Table is a compendium of these two tables. Joining these tables to the tables containing ratings may be tricky, since the dates do not necessarily align with rating actions.
ULTIMATE RECOVERY DATA

The five tables beginning with "Recovery" house ultimate recovery information. This data is a subset of the rest of the database and contains fully resolved, large US defaults since 1989. There are a few instances in the database of defaulted companies that were technically private but were public filers – e.g. they disclosed their financials prior to and during the bankruptcy process. These five tables are a complete self-contained database, so some of these tables may have similar functions to other tables in the database. Included companies may be based outside of the United States, but can only be included if they defaulted in the US (e.g. filed for bankruptcy in the US court system).

Recovery Obligor lists the issuers included in this data subset. Recovery Event shows the default periods associated with the obligor list. The latter table houses issuer event-level final recovery in the Family Recovery field. This is the dollar-weighted final recovery, discounted for lost interest, based on what was actually paid back to debt holders.

Please note that although many of these issuers / defaults can be found in the Master Issuer / Master Default Tables (by joining on the Master Issuer / Master Default Numbers) these recovery tables only refer to the largest of defaults, whereas the default tables are organized around the initial default. Therefore these datasets may not align well.

There are also trading prices post (initial) default in the Default Recovery Debt Table, which are used in the recovery calculations published in the Monthly / Annual Default Reports. For a paper analyzing the differences between the Family Recovery (in the Recovery Event Table) and the Default Price (from the Default Recovery Debt Table) please click here.

Instrument-level final recovery is found in the Recovery Instrument Table, where you can also find the Effective Interest Rate of the debt as of the Last Cash Paid. Later in the table are a set of three fields all pertaining to how much money was recovered: Nominal Settlement, Nominal Trading Price, and Nominal Liquidity. These are three different sources: what the settlement was, what was recovered based on liquidation, and the trading price in the open market. This table also includes collateral types, which is defined using information from indentures/credit agreements/10Ks and Qs or bankruptcy documents.

Each of these nominal fields has a sister discount field. These "Discount" fields contain the same data except discounted on a dollar basis for lost interest from the date of repayment back to Last Cash Paid using the Effective Interest Rate. We recommend selecting the type of recovery (for either Nominal or Discounted) based on the recommendation made in the Discount Recommended field.

The last column of the table identifies the Type of instrument (e.g. Revolver, Senior Unsecured Bond, or Term Loan).

OTHER TABLES

The remaining tables provide additional reference information to help you understand the data in the other tables or provide additional information about the issuers. The Lookup Table can translate codes in the database to text from fields ending with "_.cd". Family Structure tracks the corporate structure (i.e. parent and subsidiary relationships) from 2011. Please contact DefaultResearch@moodys.com if you have additional questions about the other tables included in the Default & Recovery Database.
How is the data updated?

Moody’s Investors Service has a team of professionals dedicated to analyzing ratings data and understanding associated trends. This Default & Ratings Analytics (DRA) team produces much of the data in DRD, and uses the data to create the Monthly Default Report and the Annual Default Study—some of the most widely-read documents published by Moody’s.

Each month, the DRA team uses financial news sources, trade publications, publicly filed documents, and Moody’s Rating analysts’ insights to identify any defaults that have occurred and add them to the database. Where available, recovery pricing is sourced from external vendors and added to the database. Occasionally, the researchers will identify new historical defaults or new information about historical defaults and will add this to the database, resulting in historical changes.

As described above, to enable researchers to compare issuers who may have different rating types, the Senior Unsecured or Equivalent algorithm (“SRA”) is used to notch different MIS-assigned ratings up or down to create a comparable rating for every issuer. Because the algorithm constantly takes updated ratings into account, it is possible that individual issuer ratings change month-to-month and accordingly the notching changes. Because the entire history is recalculated based on these new notches, this can impact both the most recent rating as well as the history. However, these changes do not materially impact the default, transition, or recovery calculations described in Moody’s default research studies.

For additional information on this algorithm, please refer to the Senior Unsecured or Equivalent algorithm methodology located here, and the most recent update to the methodology located here.

For issuer information, the primary source is the official registered debt documentation, whether an Offering Memorandum, Term Sheet, Base Prospectus, or Pricing Support. This information can either be received by the rating team, commercial, or directly from EDGAR. Third-party sources are utilized as a resource as well for both data entry and data updates. Occasionally, the researcher will have more detailed or up-to-date knowledge on a default and will add this to the database. A separate, internal verifier reviews these entries and updates are made by this individual.

As mentioned above, the DRD data is collected by a dedicated team of specialists within Moody’s Investors Service and supplemented by third-party. This data is used extensively within MIS for high-profile, recurring research studies as well as ad hoc studies. As a result, the data is continually scrutinized. The team reviews the data for overlapping defaults and unauthorized default reentry, scans for any debts with default dates before issuer defaults, and checks for duplicates. In addition to this, a manual review of the data is performed before it is finalized and ready for update.

A series of controls are in place to minimize the potential for incorrect data or violations of business rules to appear in DRD. Every month, a series of automated and manual validation checks are performed in our monthly data refresh process against the constraints defined within the Technical Specifications available here.
1. We make sure each new default event has been confirmed by the DRD Team
2. We validate any new defaulters with the DRD Team
3. We confirm that the rating tables are updated every month (up to the most recent business day)
4. We validate any new or removed issuers in the rating tables
5. We ensure that there are no instances of duplicate Master Keys throughout the database
6. We update the taxonomy for Industries/Countries, as needed
7. We make sure that every Issuer that is in default has at least one defaulted issue (e.g., has an issue with a default issue date)
8. We ensure that there are no sales dates that occur after the maturity date for a security
9. We ensure that the Rating Outlook dates do not overlap

A second manual review of the data is performed by a separate team prior to the data being processed and posted as part of the monthly refresh.

Please note that due to the size of the database and the historical nature of the data, corrections are occasionally made to the data on an ongoing basis. Accordingly, new validation checks are also added to prevent similar issues from occurring in the future. Please note that because the database covers over 100 years of market history, there may be occurrences of blank fields where the data is not available.
Coverage Analyses

Provides guidance on analyzing DRD coverage across geography and market segments. Please note that industry analysis is based on Moody’s 11 and 35; these are the market segments used in the Monthly Default Report. Moody’s 11 provides the highest level of industry classification, while Moody’s 35 provides more granular industry classification. Please click here for a description of the Moody’s 35 Industry Codes.

ISSUER COVERAGE

By Geography

Required Tables: Government Domain, Master Issuer

» Join the Government Domain Table (GOVT_DOMAIN) to the Master Issuer Table (MAST_ISSR) using the Moody’s Domain Number (MDY_DOMN_NUM)

» To organize the data by country, use the Domain Name (DOMN_NAM) and count the number of Moody’s Issuer Numbers (MAST_ISSR_NUM)

» To organize the data by region, use the Region Code (REGN_CD) and count the number of Moody’s Issuer Numbers (MAST_ISSR_NUM)

Country Access Query:
```
SELECT GOVT_DOMAIN.DOMN_NAM, Count ([MAST_ISSR].MAST_ISSR_NUM) AS COUNT_OF_MAST_ISSR_NUM FROM GOVT_DOMAIN
INNER JOIN MAST_ISSR ON GOVT_DOMAIN.MDY_DOMN_NUM = MAST_ISSR.MDY_DOMN_NUM
GROUP BY GOVT_DOMAIN.DOMN_NAM
ORDER BY COUNT (MAST_ISSR.MAST_ISSR_NUM) DESC;
```

Region Access Query:
```
SELECT GOVT_DOMAIN.REGN_CD, Count(MAST_ISSR.MAST_ISSR_NUM) AS COUNT_OF_MAST_ISSR_NUM FROM MAST_ISSR INNER JOIN GOVT_DOMAIN ON MAST_ISSR.MDY_DOMN_NUM = GOVT_DOMAIN.MDY_DOMN_NUM
GROUP BY GOVT_DOMAIN.REGN_CD
ORDER BY COUNT(MAST_ISSR.MAST_ISSR_NUM) DESC;
```

By Industry

Required Table: Master Issuer

» Within the Master Issuer (MAST_ISSR) Table select Moody’s 35 (MOODYS_35_CODE), which is the industry segmentation that Moody’s uses in the Default Research, reporting and Master Issuer Number (MAST_ISSR_NUM) fields
To create counts by Moody’s 11 rather than Moody’s 35, change Specific Industry Classification (MOODYS_35_CODE) to Broad Industry Classification (MOODYS_11_CODE)

Access Query (for Moody’s 35):
```
SELECT Count(MAST_ISSR.MAST_ISSR_NUM) AS CountOfMAST_ISSR_NUM, MAST_ISSR.MOODYS_35_CODE
FROM MAST_ISSR
GROUP BY MAST_ISSR.MOODYS_35_CODE
ORDER BY Count(MAST_ISSR.MAST_ISSR_NUM) DESC;
```

**ISSUE/DEBT COVERAGE**

*By Geography*

Required Tables: **Government Domain, Master Issuer, Master Debt**

» Join the **Government Domain Table** (GOVT_DOMAIN) to the **Master Issuer Table** (MAST_ISSR) using the Moody’s Domain Number (MDY_DOMN_NUM)

» Join the **Master Issuer Table** (MAST_ISSR) Table to the **Master Issue Table** (MAST_ISSU) using the Master Issuer Number (MAST_ISSR_NUM)

To organize data by region, use Moody's Issue Number (MAST_ISSU_NUM) and Region Code (REGN_CD)

To organize data by country, use Domain Name (DOMN_NAM), Moody's Issue Number (MAST_ISSU_NUM) and Region Code (REGN_CD)

Region Access Query:
```
SELECT Count(MAST_DEBT.MAST_DEBT_NUM) AS CountOfMAST_DEBT_NUM, GOVT_DOMAIN.REGN_CD
FROM (MAST_ISSR LEFT JOIN MAST_DEBT ON MAST_ISSR.MAST_ISSR_NUM = MAST_DEBT.MAST_ISSR_NUM) INNER JOIN
GOVT_DOMAIN ON MAST_ISSR.MDY_DOMN_NUM = GOVT_DOMAIN.MDY_DOMN_NUM
GROUP BY GOVT_DOMAIN.REGN_CD;
```

Country Access Query:
```
SELECT GOVT_DOMAIN.REGN_CD, Count(MAST_DEBT.MAST_DEBT_NUM) AS CountOfMAST_DEBT_NUM
FROM GOVT_DOMAIN INNER JOIN (MAST_ISSR INNER JOIN MAST_DEBT ON MAST_ISSR.MAST_ISSR_NUM = MAST_DEBT.MAST_ISSR_NUM) ON GOVT_DOMAIN.MDY_DOMN_NUM = MAST_ISSR.MDY_DOMN_NUM
GROUP BY GOVT_DOMAIN.REGN_CD
ORDER BY Count(MAST_DEBT.MAST_DEBT_NUM) DESC;
```
**By Industry**

Required Tables: **Master Issuer**, **Master Debt**

<table>
<thead>
<tr>
<th>MAST_ISSR</th>
<th>PK</th>
<th>MAST_ISSR_NUM</th>
</tr>
</thead>
<tbody>
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<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MAST_DEBT</th>
<th>PK</th>
<th>MAST_DEBT_NUM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Within the **Master Issuer (MAST_ISSR)** and **Master Debt (MAST_DEBT)** Table select **Specific Industry Classification (MOODYS_35_CODE)** field on **Master Issuer (MAST_ISSR)** table and **Master Debt (MAST_DEBT_NUM)** field on **Master Debt (MAST_DEBT)** table.

To create counts by Moody’s 11 rather than Moody’s 35, change **Specific Industry Classification (MOODYS_35_CODE)** to **Specific Industry Classification (MOODYS_11_CODE)** on the **Master Issuer (MAST_ISSR)** Table.

Access Query (by Moodys’ 35):

```sql
SELECT MAST_ISSR.MOODYS_35_CODE, Count(MAST_DEBT.MAST_DEBT_NUM) AS CountOfMAST_DEBT_NUM FROM MAST_ISSR INNER JOIN MAST_DEBT ON MAST_ISSR.MAST_ISSR_NUM = MAST_DEBT.MAST_ISSR_NUM GROUP BY MAST_ISSR.MOODYS_35_CODE ORDER BY Count(MAST_DEBT.MAST_DEBT_NUM) DESC;
```

**DEFAULT COVERAGE**

**By Geography**

Required Tables: **Government Domain**, **Master Issuer**, **Master Default**

<table>
<thead>
<tr>
<th>GOVT_DOMAIN</th>
<th>PK</th>
<th>MDY_DOMN_NUM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MAST_ISSR</th>
<th>PK</th>
<th>MAST_ISSR_NUM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>MAST_DFLT</th>
<th>PK</th>
<th>DEF_NUM</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Join the **Government Table (GOVT_DOMAIN)** to the **Master Issuer Table (MAST_ISSR)** Table using the Moody’s Domain Number (MDY_DOMN_NUM)

Join the **Master Issuer Table (MAST_ISSR)** to the **Master Default Table (MAST_DFLT)** using the **Master Issuer Number (MAST_ISSR_NUM)**

To organize by country, select **Domain Name (DOMN_NAM)** and count number of **Default Number (DEF_NUM)**

To organize by region, select **Region Code (REGN_CD)** and count number of **Default Number (DEF_NUM)**

Access Query:

```sql
SELECT GOVT_DOMAIN.DOMN_NAM, Count(MAST_DFLT.DEF_NUM) AS CountOfDEF_NUM FROM GOVT_DOMAIN INNER JOIN (MAST_ISSR INNER JOIN MAST_DFLT ON MAST_ISSR.MAST_ISSR_NUM = MAST_DFLT.MAST_ISSR_NUM) ON GOVT_DOMAIN.MDY_DOMN_NUM = MAST_ISSR.MDY_DOMN_NUM GROUP BY GOVT_DOMAIN.DOMN_NAM ORDER BY Count(MAST_DFLT.DEF_NUM) DESC;
```
Access Query (for Region):

```sql
SELECT GOVT_DOMAIN.DOMN_NAM, Count(MAST_DFLT.DEF_NUM) AS CountOfDEF_NUM
FROM GOVT_DOMAIN INNER JOIN (MAST_ISSR LEFT JOIN MAST_DFLT ON MAST_ISSR.MAST_ISSR_NUM = MAST_DFLT.MAST_ISSR_NUM) ON GOVT_DOMAIN.MDY_DOMN_NUM = MAST_ISSR.MDY_DOMN_NUM
GROUP BY GOVT_DOMAIN.DOMN_NAM
```

To change the region in this query replace EUR with ASA, AMR, ME AFR, or UNK.

**By Industry**

Required Tables: **Master Issuer, Master Default**

- Join the **Master Issuer Table (MAST_ISSR)** with the **Master Default Table (MAST_DFLT)** using the Master Issuer Number (MAST_ISSR_NUM) field. Thereafter, select Specific Industry Classification (MOODYS_35_CODE) field on Master Issuer (MAST_ISSR) table and Master Debt (MAST_DEBT_NUM) field on Master Debt (MAST_DEBT) table.

- To create counts by Moody’s 11 rather than Moody’s 35, change **Specific Industry Classification (MOODYS_35_CODE)** to **Specific Industry Classification (MOODYS_11_CODE)** on the **Master Issuer (MAST_ISSR)** Table.

Access Query (for Moody’s 35):

```sql
SELECT MAST_ISSR.MOODYS_35_CODE, Count(MAST_DFLT.MAST_ISSR_NUM) AS CountOfMAST_ISSR_NUM
FROM MAST_ISSR INNER JOIN MAST_DFLT ON MAST_ISSR.MAST_ISSR_NUM = MAST_DFLT.MAST_ISSR_NUM
GROUP BY MAST_ISSR.MOODYS_35_CODE;
```

To create counts by Moody’s 11 rather than Moody’s 35, change **Specific Industry Classification (MOODYS_35_CODE)** to **Specific Industry Classification (MOODYS_11_CODE)**.

**RECOVERY PRICE COVERAGE**

**By Domain**

Required Tables: **Government Domain, Master Issuer, Master Default, Default Recovery Debt**

- Join the **Government Domain Table (GOVT_DOMAIN)** to the **Master Issuer Table (MAST_ISSR)** using MDY_DOMN_NUM

- Join the **Master Issuer Table (MAST_ISSR)** to the **Master Default Table (MAST_DFLT)** using MAST_ISSR_NUM

```sql
GOVT_DOMAIN
PK MDY_DOMN_NUM

MAST_ISSR
PK MAST_ISSR_NUM

MAST_DFLT
PK DEF_NUM

DFLT_RCVRY_DEBT
PK PK DEF_ISSU_NUM
PK DEF_NUM
PK DEF_DEBT_DATETIME
```
» Join the **Master Default Table (MAST_DFLT)** to the **Default Recovery Debt Table (DFLT_RCVRY_DEBT)** Table using **Default Number**

» Filter out blanks in the Default Issue Date field in the Default Recovery Debt Table to remove any issues that did not default

» Only allow “0” in the Duplicate Debt Flag field in the Default Recovery Debt Table to remove duplicate debts

» To summarize by country, group by the **Domain Name (DOMN_NAM)** and count the number of **Default Price (DEF_PRICE)**

» To summarize by region, group by **Region Code (REGN_CD)** and count the number of **Default Price (DEF_PRICE)**

**Access Query:**

```sql
SELECT GOVT_DOMAIN.DOMN_NAM, COUNT(DFLT_RCVRY_DEBT.DEF_PRICE) AS CountOfDEF_PRICE
FROM (GOVT_DOMAIN INNER JOIN (MAST_ISSR INNER JOIN MAST_DFLT ON MAST_ISSR.MAST_ISSR_NUM = MAST_DFLT.MAST_ISSR_NUM) ON GOVT_DOMAIN.MDY_DOMN_NUM = MAST_ISSR.MDY_DOMN_NUM) INNER JOIN DFLT_RCVRY_DEBT ON MAST_DFLT.DEF_NUM = DFLT_RCVRY_DEBT.DEF_NUM
GROUP BY GOVT_DOMAIN.DOMN_NAM, GOVT_DOMAIN.REGN_CD
HAVING (((GOVT_DOMAIN.REGN_CD)="EUR"))
ORDER BY Count(DFLT_RCVRY_DEBT.DEF_PRICE) DESC
```

**By Industry**

**Required Tables:** **Government Domain, Master Issuer, Master Default, Default Recovery Debt**

» Join the **Government Domain Table (GOVT_DOMAIN)** with the **Master Issuer Table (MAST_ISSR)** using **MDY_DOMN_NUM**

» Join the **Master Issuer Table (MAST_ISSR)** to the **Master Default Table (MAST_DFLT)** using **MAST_ISSR_NUM**

» Join the **Master Default Table (MAST_DFLT)** to the **Default Recovery Debt Table (DFLT_RCVRY_DEBT)** Table using **Default Number**

» Thereafter, select **Specific Industry Classification (MOODYS_35_CODE)** field on **Issuer Master (MAST_ISSR)** table, select **Default Price (DEF_PRICE)** field on **Default Recovery Debt Table (DFLT_RCVRY_DEBT)** and select **Domain Name (DOMN_NAM)** field on **Government Domain (GOVT_DOMAIN)** table.

» To create counts by Moody’s 11 rather than Moody’s 35, change **Specific Industry Classification (MOODYS_35_CODE)** to **Specific Industry Classification (MOODYS_11_CODE)** on the **Master Issuer (MAST_ISSR)** Table.
Access Query (for Moody’s 35):

```
SELECT Count(DFLT_RCVRY_DEBT.DEF_PRICE) AS CountOfDEF_PRICE, MAST_ISSR.MOODYS_35_CODE, GOVT_DOMAIN.DOMN_NAM
FROM ((GOVT_DOMAIN INNER JOIN MAST_ISSR ON GOVT_DOMAIN.MDY_DOMN_NUM = MAST_ISSR.MDY_DOMN_NUM)
INNER JOIN MAST_DFLT ON MAST_ISSR.MAST_ISSR_NUM = MAST_DFLT.MAST_ISSR_NUM) INNER JOIN DFLT_RCVRY_DEBT
ON MAST_DFLT.DEF_NUM = DFLT_RCVRY_DEBT.DEF_NUM
GROUP BY MAST_ISSR.MOODYS_35_CODE, GOVT_DOMAIN.DOMN_NAM
ORDER BY Count(DFLT_RCVRY_DEBT.DEF_PRICE) DESC;
```

Recovery Rates for Loans and Bonds

Corporate Bond and Loan Recoveries provide historical annual average recovery rates of Senior Secured, Unsecured & Subordinated Bonds and Loans. The underlying data uses the 30 day trading price (trading price of defaulted debt) expressed as a percentage of par. Calculations at the issue-level help with historical annual recovery rates for Bonds and Loans.

This analysis looks at bonds and loans independently before computing the average recovery rates for Senior Secured, Unsecured & Subordinated Debts.

Required Tables: Master Default, Default Recovery Debt, Master Debt & Master Issuer

```
MAST_DFLT
PK DEF_NUM

DFLT_RCVRY_DEBT
PK MAST_DEBT_NUM
PK DEF_NUM
PK DEF_DEBT_DATETIME

MAST_ISSU
PK MAST_DEBT_NUM

MAST_ISSR
PK MAST_ISSR_NUM
```

Note: Mast_Issu must be “left joined” to Mast_Issr

» Join the Default Recovery Debt Table (DFLT_RCVRY_DEBT) to the Master Debt Table (MAST_DEBT) using MAST_DEBT_NUM

» Join the Default Recovery Debt Table (DFLT_RCVRY_DEBT) to the Master Default Table (MAST_DFLT) using DEF_NUM

» Join the Master Debt Table (MAST_DEBT) to the Master Issuer Table (MAST_ISSR) using the MAST_ISSR_NUM

The below rules should be applied before calculating recovery rates for Bonds and Loans:

» Exclude “Sub-Sovereign”, “Sovereign”, “Structured Finance”, “Municipal” within in the MDY_BROAD_IND field in the Master Issuer Table (MAST_ISSR)

» Exclude “Grace Period Defaults and Cross Default” within in the DEF_TYP_CD field in the Master Default Table (MAST_DFLT)

Set IS_DUP_DEBT <> '1' on DFLT_RCVRY_DEBT Table to remove duplicated debts.

Include "CLN", "CON", "EET", "EEET", "EQT", "FMB", "IRB", "REG", "SLB", "SPN", "LTPD" in the DEBT_CLASS_CD field in the DFLT_RCVRY_DEBT Table. For additional details, please see the Appendix.

Include "BL", "BCF" within the DEBT_CLASS_CD field in the DFLT_RCVRY_DEBT Table. For additional details, please see the Appendix.

Calculations:

Group by YEAR(DEF_DEBT_DATETIME), DEF_DEBT_SENR and DEF_NUM, and average all DEF_PRICE. This will yield the average recovery rate per year by seniority per default event.

Group results again by YEAR(DEF_DEBT_DATETIME) and DEF_DEBT_SENR, and average all DEF_PRICES. Double averaging will skew the results since there are some default events with many debts with the same default date.

Note: Loan Prices are missing for some debts due to the proprietary nature of some of our recovery price sources. As a result, recovery rates may not match exactly with the Monthly Default Report.

Recovery Rate Access Query

Step 1: Run the below query and save as "Debt seniorities".

```
```

Step 2: Run the below query against the above “Debt seniorities” query.

```
```
**Rating Transition Matrix**

Rating Transition Matrices show rating movements for groups of issuers sorted by their starting rating and revealing if they upgraded, downgraded, remained at the same rating, defaulted, or withdrew during a cohort period. The left column of this query will show the starting rating, the top row shows the ending rating, and the contents of the table count the issuers that fit those two categories.

**Required Tables:** **Senior Rating Standard** & **Senior Default Standard**

![Senior Rating Standard Table](image)

![Senior Default Standard Table](image)

» Determine your cohort start and end date. For example, to calculate a 2015 transition, the start date will be January 1st, 2015 and the end date will be December 31st, 2015. Create a new table "**cohort_dt**" having two columns only i.e 'cohort_dt' and 'horizon by years'. Enter values of 1/1/2015 in cohort_dt and 1 year in horizon by years. Please see a snapshot of this table below:

![Snapshot of cohort_dt Table](image)

You will have to change the date in this table and save for each and every year for which you wish to run a transition matrix.

**Step 1:** Run the below query and save as "**cohort - step1 -- removing in withdrawal orgs**"

```sql
SELECT cohort_dt.cohort_dt, SENR_RATG_STANDARD.MAST_ISSR_NUM, SENR_RATG_STANDARD.ISSR_RATG_NUM, SENR_RATG_STANDARD.ISSR_RATG_TXT
FROM cohort_dt, SENR_RATG_STANDARD
WHERE (((SENR_RATG_STANDARD.ISSR_RATG_NUM)<>0) AND ((SENR_RATG_STANDARD.RATG_DATETIME)<[cohort_dt].[cohort_dt]) AND ((SENR_RATG_STANDARD.RATG_EXPIRE_DATETIME)>=[cohort_dt].[cohort_dt])) OR (((SENR_RATG_STANDARD.ISSR_RATG_NUM)<>0) AND ((SENR_RATG_STANDARD.RATG_DATETIME)<[cohort_dt].[cohort_dt]) AND ((SENR_RATG_STANDARD.RATG_EXPIRE_DATETIME) Is Null));
```

**Step 2:** Run the below query and save as "**cohort - step2 -- creating list of in default orgs**"

```sql
SELECT [cohort - step1 -- removing in withdrawal orgs].MAST_ISSR_NUM
FROM [cohort - step1 -- removing in withdrawal orgs] INNER JOIN SENR_DFLT_STANDARD ON [cohort - step1 -- removing in withdrawal orgs].MAST_ISSR_NUM = SENR_DFLT_STANDARD.MAST_ISSR_NUM
WHERE (((SENR_DFLT_STANDARD.DFLT_DATETIME)<[cohort_dt].[cohort_dt]) AND ((SENR_DFLT_STANDARD.COHORT_REENTRY_DATETIME)>=[cohort_dt].[cohort_dt]) OR (((SENR_DFLT_STANDARD.DFLT_DATETIME)<[cohort_dt].[cohort_dt]) AND ((SENR_DFLT_STANDARD.DFLT_DATETIME)<[cohort_dt].[cohort_dt]) AND ((SENR_DFLT_STANDARD.RATG_EXPIRE_DATETIME) Is Null));
```

**Step 3:** Run the below query and save as "**cohort - step3 -- creating list of in withdrawal orgs**"

```sql
SELECT cohort_dt.cohort_dt, SENR_RATG_STANDARD.MAST_ISSR_NUM, SENR_RATG_STANDARD.ISSR_RATG_NUM, SENR_RATG_STANDARD.ISSR_RATG_TXT
FROM cohort_dt, SENR_RATG_STANDARD
WHERE (((SENR_RATG_STANDARD.ISSR_RATG_NUM)<>0) AND ((SENR_RATG_STANDARD.RATG_DATETIME)<[cohort_dt].[cohort_dt]) AND ((SENR_RATG_STANDARD.RATG_EXPIRE_DATETIME)>=[cohort_dt].[cohort_dt])) OR (((SENR_RATG_STANDARD.ISSR_RATG_NUM)<>0) AND ((SENR_RATG_STANDARD.RATG_DATETIME)<[cohort_dt].[cohort_dt]) AND ((SENR_RATG_STANDARD.RATG_EXPIRE_DATETIME) Is Null));
```
Step 3: Run the below query and save as “cohort - step3 -- removing in default orgs”

Using the below will create a list of issuers that do not have any defaulters within the cohort period. In this step, a left outer join will connect step 1 and 2 to exclude any defaulters from the universe.

```sql
SELECT [cohort - step1 -- removing in withdrawal orgs].MAST_ISSR_NUM, [cohort - step1 -- removing in withdrawal orgs].ISSR_RATG_NUM, [cohort - step1 -- removing in withdrawal orgs].ISSR_RATG_TXT
WHERE ((([cohort - step2 -- creating list of in default orgs].MAST_ISSR_NUM) Is Null));
```

Step 4: Run the below query and save as "defaults - step4"

Using the below will create a list of issuers by joining the subset from step 3 to the Senr_Dflt_Standard table. The default date should be greater than equal to cohort date and < cohort end date.

```sql
SELECT [cohort - step3 -- removing in default orgs].MAST_ISSR_NUM
FROM cohort_dt, [cohort - step3 -- removing in default orgs] INNER JOIN SENR_DFLT_STANDARD ON [cohort - step3 -- removing in default orgs].MAST_ISSR_NUM = SENR_DFLT_STANDARD.MAST_ISSR_NUM
WHERE (((SENR_DFLT_STANDARD.DFLT_DATETIME)>=[cohort_dt].[cohort_dt] And (SENR_DFLT_STANDARD.DFLT_DATETIME)<DateAdd("yyyy",[cohort_dt].[horizon by years],[cohort_dt].[cohort_dt])))
GROUP BY [cohort - step3 -- removing in default orgs].MAST_ISSR_NUM;
```

Step 5 – Run the below query and save as “rating changes - step5”

Using the below will identify the ratings of the issuers identified in step 3. Join step 3 results to the Senr_Ratg_Standard table and specify the rating date criteria to be considered within the cohort period.

```sql
SELECT [cohort - step3 -- removing in default orgs].MAST_ISSR_NUM, SENR_RATG_STANDARD.ISSR_RATG_NUM, SENR_RATG_STANDARD.ISSR_RATG_TXT
FROM cohort_dt, [cohort - step3 -- removing in default orgs] INNER JOIN SENR_RATG_STANDARD ON [cohort - step3 -- removing in default orgs].MAST_ISSR_NUM = SENR_RATG_STANDARD.MAST_ISSR_NUM
WHERE (((SENR_RATG_STANDARD.RATG_DATETIME)<=DateAdd("yyyy",[cohort_dt].[horizon by years],[cohort_dt].[cohort_dt])-1) AND ((SENR_RATG_STANDARD.RATG_EXPIRE_DATETIME)>DateAdd("yyyy",[cohort_dt].[horizon by years],[cohort_dt].[cohort_dt])-1)) OR (((SENR_RATG_STANDARD.RATG_DATETIME)<=DateAdd("yyyy",[cohort_dt].[horizon by years],[cohort_dt].[cohort_dt])-1) AND ((SENR_RATG_STANDARD.RATG_EXPIRE_DATETIME) Is Null));
```

Step 6 – Run the below query and save as “withdrawals - step6”

```sql
SELECT [cohort - step3 -- removing in default orgs].MAST_ISSR_NUM
FROM cohort_dt, [cohort - step3 -- removing in default orgs] INNER JOIN SENR_RATG_STANDARD ON [cohort - step3 -- removing in default orgs].MAST_ISSR_NUM = SENR_RATG_STANDARD.MAST_ISSR_NUM
WHERE (((SENR_RATG_STANDARD.ISSR_RATG_NUM)=0) AND ((SENR_RATG_STANDARD.RATG_DATETIME)>=[cohort_dt].[cohort_dt] And (SENR_RATG_STANDARD.RATG_DATETIME)<DateAdd("yyyy",[cohort_dt].[horizon by years],[cohort_dt].[cohort_dt])-1)) OR (((SENR_RATG_STANDARD.ISSR_RATG_NUM)=0) AND ((SENR_RATG_STANDARD.RATG_DATETIME)=DateAdd("yyyy",[cohort_dt].[horizon by years],[cohort_dt].[cohort_dt])-1) AND ((SENR_RATG_STANDARD.RATG_EXPIRE_DATETIME) Is Null));
```
Step 7 – Run the below query by joining the above queries from steps 3, 4, 5, and 6

TRANSFORM Count([cohort - step3 -- removing in default orgs].MAST_ISSR_NUM) AS CountOfMAST_ISSR_NUM
GROUP BY [cohort - step3 -- removing in default orgs].ISSR_RATG_TXT, [cohort - step3 -- removing in default orgs].ISSR_RATG_NUM
ORDER BY [cohort - step3 -- removing in default orgs].ISSR_RATG_NUM
Ultimate Recovery Query

```
FROM (((MAST_ISSR INNER JOIN RECOVERY_OBLIGOR ON MAST_ISSR.MAST_ISSR_NUM = RECOVERY_OBLIGOR.MAST_ISSR_NUM) INNER JOIN RECOVERY_EVENT ON RECOVERY_OBLIGOR.OBLIGOR_ID = RECOVERY_EVENT.OBLIGOR_ID) INNER JOIN RECOVERY_CLASS ON RECOVERY_EVENT.EVENT_ID = RECOVERY_CLASS.EVENT_ID) INNER JOIN RECOVERY_INSTRUMENT ON RECOVERY_CLASS.CLASS_ID = RECOVERY_INSTRUMENT.CLASS_ID
ORDER BY RECOVERY_OBLIGOR.NAM, RECOVERY_EVENT.ISSUER_DEFAULT_DATETIME, RECOVERY_INSTRUMENT.DESC, RECOVERY_INSTRUMENT.COLLATERAL_RANK, RECOVERY_INSTRUMENT.COLLATERAL_TYPE, IIf([RECOVERY_CLASS][PREFERRED_METHOD]="Trading Price",[RECOVERY_INSTRUMENT][DISCOUNT_TRADING_PRICE],IIf([RECOVERY_CLASS][PREFERRED_METHOD]="Liquidity",[RECOVERY_INSTRUMENT][DISCOUNT_LIQUIDITY_TOTAL],[RECOVERY_INSTRUMENT][DISCOUNT_SETTLEMENT_TOTAL]) DESC;
```
## APPENDIX: Debt Class Code Description

<table>
<thead>
<tr>
<th>FIELD_CD</th>
<th>FIELD_TXT</th>
</tr>
</thead>
<tbody>
<tr>
<td>CLN</td>
<td>Collateralized Note</td>
</tr>
<tr>
<td>CON</td>
<td>Conv./Exch. Bond/Debenture</td>
</tr>
<tr>
<td>EET</td>
<td>Enhanced Equipment Trust</td>
</tr>
<tr>
<td>EETC</td>
<td>Enhanced Equipment Trust Certificate</td>
</tr>
<tr>
<td>EQT</td>
<td>Equipment Trust</td>
</tr>
<tr>
<td>FMB</td>
<td>First Mortgage Bonds</td>
</tr>
<tr>
<td>IRB</td>
<td>Revenue Bonds</td>
</tr>
<tr>
<td>LTPD</td>
<td>Long Term Public Debt (bonds)</td>
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<td>Regular Bond/Debenture</td>
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<td>Sec. Lease Oblig. Bond</td>
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<td>SPN</td>
<td>Surplus Notes</td>
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<tr>
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</tr>
<tr>
<td>BCF</td>
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