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Default research — Global

# Default and recovery rates for project finance bank loans, 1983-2018: Sustainable project finance bank loans

We compare the credit characteristics of sustainable and non-sustainable project finance bank loans. We define sustainable project finance bank loans as those that were issued for green use-of-proceeds projects or for projects with social responsibility characteristics. This report is an addendum to our March 2020 study.

» **Projects with sustainability characteristics are concentrated in advanced economies.** Nearly all social and close to 90% of green projects included in the data set were originated in advanced economies. Sustainable projects account for 51.6% of the total data sample.

» **Sustainable projects have lower default risk, but sustainability is not the principal driver.** Differences in default risk are likely the result of differences in contractual arrangements, phase of the credit cycle, jurisdiction, industry and idiosyncratic project risks. Defaults often cluster around country risk and industry events. Differences between jurisdiction and use-of-proceeds largely diminish by years 5-7 once a project has established an operating track record. Marginal default rates tend to decline to levels consistent with those of single A-rated corporates by year 7.

» **Social projects lie at the low end of the risk spectrum, benefiting from a high prevalence of availability-based payment structures with governmental offtakers.** These projects have a 10-year cumulative default rate (CDR) of 1.1% (Basel) and 0.4% (Moody's). The 10-year CDR is higher in emerging market and developing economies (EMDEs), where social projects are not very common.

» **Green projects have a 10-year CDR of 4.9% (Basel) and 2.9% (Moody's), below those of non-green projects.** Non-green projects have a 10-year CDR of 7.1% (Basel) and 4.7% (Moody's). Renewable power projects often benefit from contractual payment schemes that support lower default risk than for transportation projects or biofuels projects with exposure to market risk.

» **Ultimate recovery rates vary by industry, region and use-of-proceeds. The median ultimate recovery for most subsets is 100%**. Average ultimate recovery rates for the total data sample of 81.5% (Basel) and 79.5% (Moody's) are comparable to the March 2020 study (77.9% Basel, 75.8% (Moody's). Power projects have higher than average recovery rates. Social and green oil and gas projects have experienced lower than average ultimate recovery rates.

## Scope

The coronavirus outbreak's potential impact on longer-term sustainable finance initiatives around the world is uncertain. Governments are currently focused on responding to the crisis. Uncertainty remains how sustainability and climate initiatives will fare alongside the attention to restoring economic growth. A number of European leaders have articulated a desire to root the economic recovery in sustainability.

This addendum to our March 2020 study analyzes the credit performance of sustainable project finance bank loans included in the study data set. We define sustainable project finance bank loans as those that were issued for green use-of-proceeds projects or for projects with social responsibility characteristics, such as hospitals and schools.

We explore the hypothesis that sustainable project finance bank loans have different credit characteristics that support lower default rates and different recovery rates than non-sustainable project finance bank loans.

We have focused on the three largest sectors included in the study data set: infrastructure, power and oil and gas. The three industry sectors comprise 85.7% of the 8,583 project finance bank loans included in the data set for the period from 1 January 1983 to 31 December 2018. They drive the results of the overall study data set and are, therefore, a representative subset.

This addendum further expands our analysis presented in the September 2018 addendum on green project finance bank loans.

We also compare the credit performance of certain subsets of projects in advanced economies with certain projects in emerging market and developing economies (EMDEs). We analyze two EMDE regional subsets:

1. EMDE-A: A subset based on the World Bank Group's (WBG) average income level country classifications, 1995-2018,
2. EMDE-B: A subset comprised of EMDE-A countries but excluding eleven countries that are in the European Economic Area (EEA) and/or OECD member countries.

The study uses the Basel definition of default (Basel)[1]. We also apply Moody's definition of default (Moody's) and present the results for selected exhibits in this report.

The Basel definition of default captures a wider range of defaults than our definition of default. The Basel definition includes circumstances in which the reporting bank considers that the obligor is unlikely to pay its credit obligations in full, but a payment default has not occurred yet. Please see Appendix 3: Glossary for a more detailed version of these default definitions.

While not directly comparable, we have referenced in certain exhibits marginal annual default rates and cumulative default rates experienced by Moody's-rated corporate bond and loan issuers based on our definition of default.

Terminology: In certain instances, we use a suffix notation to clarify whether we present information based on the Basel definition of default (Basel) or Moody's definition of default (Moody's).

Caveats

We report on historical project finance default and recovery rates, including segmented analysis by region, use-of-proceeds and industry. Segmented analysis will lead to small sample sizes that lack the statistical robustness of larger sample sizes.

» The reader should carefully interpret observations for small sample sizes.

» Many projects have yet to emerge from default, which can change the average ultimate recovery rates when corresponding recovery data is available, in particular for small subsets.

» The inclusion of additional data will lead to different results in future studies, and such differences may be material.

Political risk insurance: ultimate recovery values exclude any recoveries under political risk insurance arrangements. The number of defaults of facilities backed or insured by Export Credit Agencies is very small and not statistically significant.

We source the data presented in the March 2020 study and in this addendum from the Moody's Analytics Data Alliance Project Finance Data Consortium (the Data Consortium). Moody's Analytics compiles all analytics and statistics on behalf of Moody's Investors Service. Moody's Investors Service prepares all market and industry commentary. For further information, see "About the Moody's Analytics Data Alliance."

We wish to acknowledge and thank each of the financial institutions in the Data Consortium for supporting and contributing to the study and this addendum.

**Sustainable finance taxonomies continue to advance**

Throughout this report, we classify certain project finance bank loans in the three largest industry sectors of the study (infrastructure, power, oil and gas) as sustainable. In this category we include the following subindustries:

- green — clean transportation: electric, hybrid, public, rail, nonmotorized, multimodal transportation, infrastructure for clean-energy vehicles and reduction of harmful emissions
- green — environmental: wastewater and water
- green — renewable power: solar, hydro, wind, energy efficiency
- green — oil and gas: biofuels
- social — hospitals and schools

For these project finance bank loans, proceeds have typically been earmarked to finance green and social projects. However, this classification is not binary. Certain social projects may have environmental benefits, for example hospitals with green building characteristics. Certain green projects may have social benefits, for example clean drinking water projects.

We have compared our mapping to available sustainable finance taxonomies in the market. We believe that our characterization of projects is comparable to existing Green Bond Principles, Social Bond Principles as well as the proposed sustainable finance taxonomy of the European Union.

However, the available information on the project finance bank loans included in the study data set can limit the accuracy of our mapping of projects as sustainable.

Since our September 2018 report, sustainable finance taxonomies have continued to advance.

Green bonds have generally been issued pursuant to a set of voluntary guidelines or framework known as the Green Bond Principles, published by the International Capital Markets Association (ICMA).

The Climate Bond Standard by the Climate Bond Initiative provides sector-specific eligibility criteria for assets and projects that can be used for Climate Bonds and Green Bonds. Climate Bonds Initiative data are widely used in the market and include detailed information on green bond transactions across the globe.

Proceeds of Green Bonds will be exclusively applied to finance or refinance new and/or existing eligible "green" projects. Project examples include renewable energy, energy efficiency, clean transportation, sustainable water management and green buildings.

Proceeds of Social Bonds will be exclusively applied to finance or refinance new or existing eligible "social" projects. Project examples include affordable basic infrastructure (for example clean drinking, water, sewers, sanitation, transport, energy), access to essential services (for example health, education and vocational training, healthcare, financing and financial services), affordable housing, employment generation including through the potential effect of SME financing and microfinance, food security, socioeconomic advancement and empowerment. Social bonds are typically issued in accordance with ICMA's Social Bond Principles.

Sustainability bonds are bonds where the proceeds will be exclusively applied to finance or refinance a combination of new or existing eligible green and social projects. These are typically issued in accordance with ICMA's Sustainability Bond Guidelines.

Similar standards exist for loans.

In addition, the European Union (EU) is developing its own sustainable finance taxonomy and proposed a Green Bond Standard (GBS). The EU's Technical Expert Group (TEG) published a new set of reports in March 2020.

These reports include (1) the final report on the EU taxonomy; (2) a technical annex to the taxonomy report containing an updated list of technical screening criteria for economic activities that can substantially contribute to climate change mitigation or adaptation; and (3) a usability guide offering guidance on the use of the proposed GBS.

The EU taxonomy for climate change mitigation and climate change adaptation could be established as early as by the end of 2020 with full application by the end of 2021. For the four other objectives (sustainable use and protection of water and marine resources; transition to a circular economy; pollution prevention control; and protection and restoration of biodiversity and ecosystems), the taxonomy could be established by the end of 2021 for application by the end of 2022.

In addition to the updated technical screening criteria and methodology section, the final report also contains suggestions for the potential focus of future work. In particular, it highlights the concept of a "fully realized" taxonomy that should also incorporate (1) social objectives and (2) technical screening criteria for significant levels of harm to environmental objectives or so called "polluting" or "brown" taxonomy criteria.

## Mapping of the data set

Exhibit 1 shows the composition of the total data sample for this report by industry sector and how we have mapped subsectors to their use-of-proceeds. The total data sample includes 85.7% of projects and 77.3% of defaults (Basel) from the March 2020 study. Sustainable projects account for 51.6% of projects (38.0% green, 13.7% social) but for only 37.7% of defaults (Basel) (33.5% green, 4.2% social) included in the total data sample.

Exhibit 1

**Composition of the total data sample by industry sector and use-of-proceeds**

| | Projects | | | | | Defaults (Basel definition) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | Total project count | Green use-of proceeds | Non-green use-of-proceeds | Social use-of-proceeds | Other (indeterminate) | Total defaults | Green use-of-proceeds | Non-green use-of-proceeds | Social use-of-proceeds | Other (indeterminate) |
| **Infrastructure** | **2493** | **477** | **936** | **1006** | **74** | **139** | **32** | **83** | **19** | **5** |
| Clean transportation | 172 | 172 | | | | 14 | 14 | | | |
| Transportation | 936 | | 936 | | | 83 | | 83 | | |
| Environmental (water, wastewater) | 305 | 305 | | | | 18 | 18 | | | |
| Social | 1006 | | | 1006 | | 19 | | | 19 | |
| Infrastructure-other | 74 | | | | 74 | 5 | | | | 5 |
| **Power** | **3884** | **2274** | **1610** | | | **243** | **99** | **144** | | |
| Renewable power | 2263 | 2263 | | | | 99 | 99 | | | |
| Renewable power transmission | 11 | 11 | | | | 0 | 0 | | | |
| Non-renewable power | 1388 | | 1388 | | | 127 | | 127 | | |
| Non-renewable power transmission | 222 | | 222 | | | 17 | | 17 | | |
| **Oil and gas** | **977** | **41** | **936** | | | **72** | **21** | **51** | | |
| Oil and gas distribution | 205 | | 205 | | | 11 | | 11 | | |
| Oil and gas refining | 73 | | 73 | | | 6 | | 6 | | |
| Renewable oil and gas | 41 | 41 | | | | 21 | 21 | | | |
| Exploration and production | 400 | | 400 | | | 21 | | 21 | | |
| LNG | 156 | | 156 | | | 7 | | 7 | | |
| Oil and gas | 31 | | 31 | | | 1 | | 1 | | |
| Oil and gas-storage | 67 | | 67 | | | 5 | | 5 | | |
| Oil and gas-other | 4 | | 4 | | | 0 | | 0 | | |
| **Total data sample** | **7354** | **2792** | **3482** | **1006** | **74** | **454** | **152** | **278** | **19** | **5** |
| *As a % of total study data* | *85.7%* | | | | | *77.3%* | | | | |
| Excluded sectors | 1229 | | | | | 133 | | | | |
| Chemicals production | 170 | | | | | 15 | | | | |
| Leisure and recreation | 188 | | | | | 14 | | | | |
| Manufacturing | 75 | | | | | 16 | | | | |
| Media and telecom | 447 | | | | | 49 | | | | |
| Metals and mining | 283 | | | | | 37 | | | | |
| Other | 66 | | | | | 2 | | | | |
| **Total study data set** | **8583** | | | | | **587** | | | | |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

## Summary of findings

We summarize in this section our key findings for the total data sample as well as for the different subsets by use-of-proceeds, industry sector and region.

**Findings for the total data sample and comparison to the March 2020 study**

Key findings in this report are consistent with our findings of the March 2020 study.

The three industry sectors in this report represent around 85.7% of total projects, but only around 77.3% of total Basel defaults of the March 2020 study. The total data sample for this report includes 7,354 projects, 454 Basel defaults and 299 Moody's defaults, as well as 194 Basel recoveries and 161 Moody's recoveries.

Marginal annual default rates and CDRs for the total data sample are slightly lower than in the March 2020 study. The March 2020 study also includes sectors with historically higher default risk, such as manufacturing, metals and mining, media and telecom.

The 10-year CDR for the total data sample is 5.0% (Basel) and 3.2% (Moody's) and compares to 5.5% (Basel) and 3.7% (Moody's) for the March 2020 study. CDRs are also modestly lower across regional subsets than reported for the total March 2020 study.

Average ultimate recovery rates for the total data sample of 81.5% (Basel) and 79.5% (Moody's) are comparable to the March 2020 study (77.9% Basel, 75.8% (Moody's).

In this report the infrastructure sector represents 33.9% of projects of the total data sample, the power sector 52.8% and the oil and gas sector 13.3%. The infrastructure sector represents 30.6% of Basel defaults, power 53.5%, and oil and gas 15.9%.

**Findings by use-of-proceeds and region**

Exhibit 2 summarizes the key findings by use-of-proceeds and by regional subsets.

**Projects with sustainability characteristics are concentrated in the advanced economy subsets:**

» The total data sample has a higher concentration in advanced economies, which is more pronounced for sustainable projects. EEA/OECD countries account for 89.5% of green projects, 73.3% of non-green projects and 97.7% of social projects. In our advanced economy subsets 57.1%-69.2% of projects are sustainable projects, which reduces to 26.6%-29.4% for our EMDE subsets.

**Sustainable project finance bank loans included in the data sample have lower default risk than non-sustainable projects. Other factors such as the contractual agreements are likely more important drivers in lowering default risk than sustainability:**

» Social projects lie at the low end of the risk spectrum with a 10-year CDR of 1.1% (Basel) and 0.4% (Moody's) for the total data sample. The 10-year CDR (Basel) for social projects is higher in EMDEs (5.0% in EMDE-A, 9.9% in EMDE-B). The count of social projects in EMDEs is very limited and does not allow for robust conclusions. The data sample only includes 32 social projects in EMDE-A and 14 in EMDE-B, of which 2 have defaulted. Please see Exhibit 3.

» Green projects have a 10-year CDR of 4.9% (Basel) and 2.9% (Moody's) for the total data sample, below those of non-green projects but higher than for social projects. Green projects have lower 10-year CDRs (Basel) in most regional subsets. The EMDE-A subset is the only subset that shows a higher 10-year CDR for green projects than for non-green projects. The EMDE-A subset includes a higher number of defaults of green projects in Poland, Mexico, Romania and Chile. These countries are not included in the EMDE-B subset. Please see Exhibit 3.

» Non-green projects have a 10-year CDR of 7.1% (Basel) and 4.7% (Moody's) for the total data sample. Please see Exhibit 3.

» Differences in default risk are likely the result of differences in contractual arrangements, phase of the credit cycle, jurisdiction, industry and idiosyncratic project risks.

» Defaults in project finance often cluster around country risk and industry events. Social projects, many renewable power projects and environmental projects benefit from availability-based revenue schemes, which reduce default risk. All social projects included in the report are availability-based payment projects and 85.7% of social projects are availability-based PPP projects.

**Use-of-proceeds and jurisdiction are less important once a project has an operating track record:**

» Marginal default rates for project finance bank loans tend to decline over time to levels consistent with the default experience of single A-rated corporate loans and bonds by year seven. Both jurisdiction and the use-of-proceeds seem to play a less critical role by year 5-7 from cohort formation.

**Ultimate recovery rates vary by industry, region and use-of-proceeds. The median ultimate recovery for most subsets is 100%, this means no economic loss:**

» However, the distribution of ultimate recovery rates has high kurtosis and around 9.3% of observations have an average ultimate recovery rate in the range of 0%-24%.

» Average ultimate recovery rates for green and non-green projects show some variation by region, but remain in a narrow range of 71.9%-88.7% (Basel). Social projects have one of the lowest average ultimate recovery rates (Basel) of 66.2% for the total data sample. But we base this finding on only 8 observations. EMDEs only include one recovery count for social projects with an average ultimate recovery rate of 68.5%. Please see Exhibit 4.

**Impact of causes of default on default and recovery experience :**

» In EEA and EEA/OECD countries, the most prevalent cause of default is market risk (EEA 31.8% and 37.5%), consistent with our findings in the March 2020 study. The share of defaults for which country risk is the primary cause of default is less than 5%.

» In the EMDE subsets, country risk (EMDE-A 35.7%, EMDE-B 45.5%) is the most prevalent cause of default, followed by construction risk and market risk.

» None of the defaults of social projects or green power projects were caused by exposure to market risks. This reflects that all social projects in the data sample are availability-based projects and many green power projects benefit from purchase power agreements.

Exhibit 2

**Key findings by use-of-proceeds and regional subsets**

| | Project count | Default count (Basel) | Recovery count (Basel) | Avg. ultimate recovery rate (Basel) | 10-year CDR (Basel) | Default count (Moody's) | Recovery count (Moody's) | Avg.ultimate recovery rate (Moody's) | 10-year CDR (Moody's) |
|---|---|---|---|---|---|---|---|---|---|
| **EEA** | **3313** | **188** | **66** | **83.8%** | **4.5%** | **92** | **44** | **79.6%** | **2.1%** |
| Green use-of-proceeds | 1492 | 75 | 23 | 88.7% | 4.5% | 33 | 12 | 79.1% | 2.0% |
| Non-green use-of-proceeds | 986 | 94 | 36 | 82.9% | 9.0% | 51 | 26 | 82.6% | 4.2% |
| Social | 801 | 16 | 6 | 71.4% | 1.1% | 7 | 5 | 65.7% | 0.4% |
| Other | 34 | 3 | 1 | 78.8% | 11.0% | 1 | 1 | 78.8% | 4.2% |
| | | | | | | | | | |
| **EEA/OECD** | **6097** | **367** | **160** | **82.2%** | **5.0%** | **225** | **129** | **79.4%** | **2.9%** |
| Green use-of-proceeds | 2500 | 135 | 51 | 78.7% | 5.0% | 79 | 38 | 71.6% | 2.8% |
| Non-green use-of-proceeds | 2554 | 211 | 101 | 85.1% | 7.9% | 137 | 84 | 84.3% | 4.8% |
| Social | 983 | 17 | 7 | 65.8% | 1.0% | 8 | 6 | 60.1% | 0.4% |
| Other | 60 | 4 | 1 | 78.8% | 9.4% | 1 | 1 | 78.8% | 3.6% |
| | | | | | | | | | |
| **EMDE-A** | **1307** | **112** | **42** | **80.0%** | **6.7%** | **86** | **39** | **80.9%** | **5.3%** |
| Green use-of-proceeds | 352 | 34 | 15 | 76.7% | 7.7% | 23 | 14 | 75.0% | 5.7% |
| Non-green use-of-proceeds | 907 | 75 | 26 | 82.4% | 6.4% | 60 | 24 | 84.8% | 5.1% |
| Social | 32 | 2 | 1 | 68.5% | 5.0% | 2 | 1 | 68.5% | 5.0% |
| Other | 16 | 1 | 0 | n/a | 6.3% | 1 | 0 | n/a | 6.3% |
| | | | | | | | | | |
| **EMDE-B** | **972** | **86** | **33** | **77.8%** | **6.8%** | **73** | **31** | **79.4%** | **6.0%** |
| Green use-of-proceeds | 245 | 16 | 9 | 71.9% | 4.9% | 14 | 9 | 71.9% | 5.3% |
| Non-green use-of-proceeds | 704 | 67 | 23 | 80.5% | 7.3% | 56 | 21 | 83.1% | 6.1% |
| Social | 14 | 2 | 1 | 68.5% | 9.9% | 2 | 1 | 68.5% | 9.9% |
| Other | 9 | 1 | 0 | n/a | 9.9% | 1 | 0 | n/a | 9.9% |
| | | | | | | | | | |
| **Total regional subsets** | **7069** | **453** | **193** | **81.4%** | **5.3%** | **298** | **160** | **79.4%** | **3.3%** |
| Green use-of-proceeds | 2745 | 151 | 60 | 77.6% | 5.0% | 93 | 47 | 71.7% | 3.0% |
| Non-green use-of-proceeds | 3258 | 278 | 124 | 84.2% | 7.7% | 193 | 105 | 84.1% | 5.1% |
| Social | 997 | 19 | 8 | 66.2% | 1.1% | 10 | 7 | 61.3% | 0.5% |
| Other | 69 | 5 | 1 | 78.8% | 9.4% | 2 | 1 | 78.8% | 4.4% |
| | | | | | | | | | |
| **Total data sample** | **7354** | **454** | **194** | **81.5%** | **5.0%** | **299** | **161** | **79.5%** | **3.2%** |
| Green use-of-proceeds | 2792 | 152 | 61 | 78.0% | 4.9% | 94 | 48 | 72.3% | 2.9% |
| Non-green use-of-proceeds | 3482 | 278 | 124 | 84.2% | 7.1% | 193 | 105 | 84.1% | 4.7% |
| Social | 1006 | 19 | 8 | 66.2% | 1.1% | 10 | 7 | 61.3% | 0.4% |
| Other | 74 | 5 | 1 | 78.8% | 8.7% | 2 | 1 | 78.8% | 4.1% |

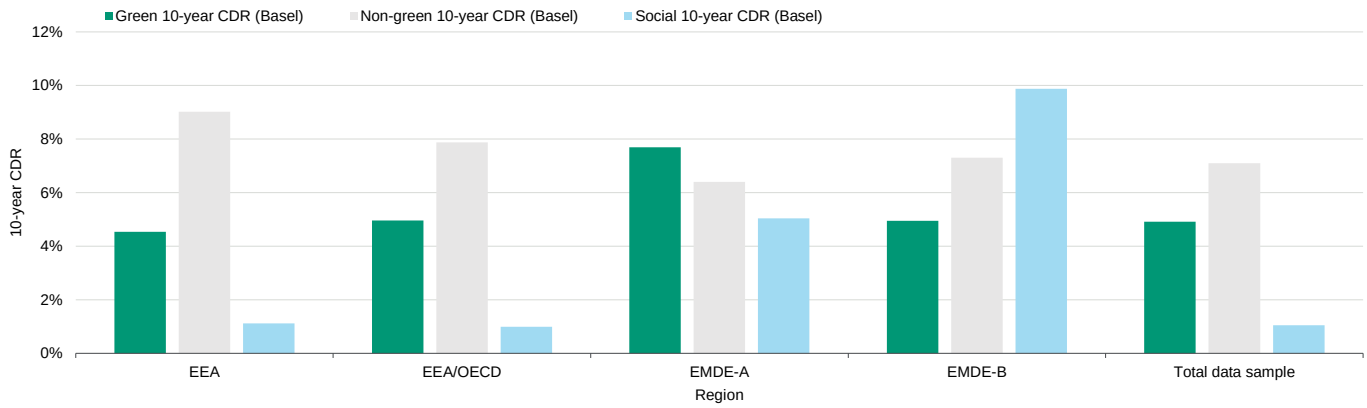
*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

### Findings by use-of-proceeds, region and industry

Exhibit 3 shows 10-year CDRs (Basel) by use-of-proceeds and by regional subsets.

Exhibit 3

**10-year CDR (Basel) by use-of-proceeds**

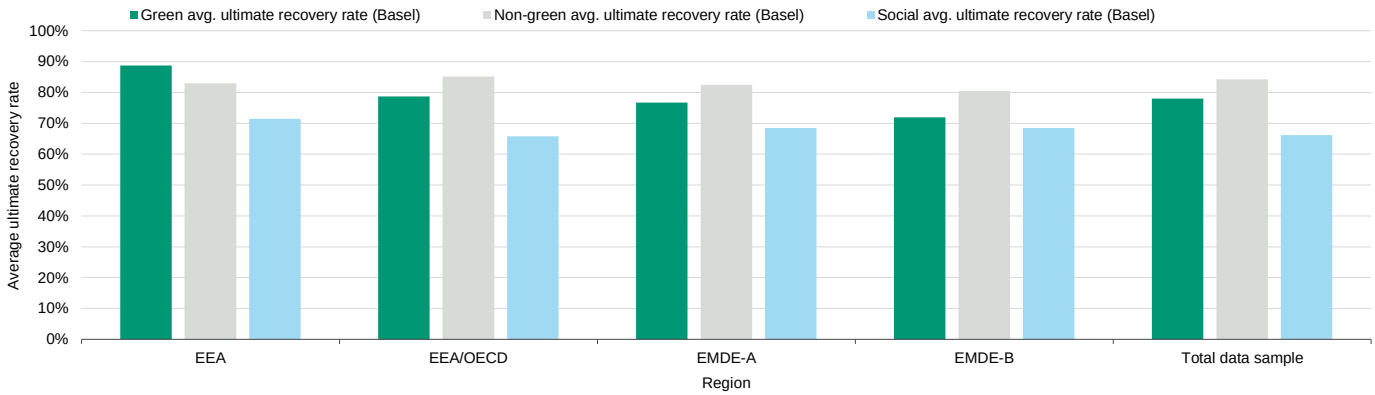



*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 4 shows average ultimate recovery rates (Basel) by use-of-proceeds and by regional subsets.

Exhibit 4

**Average ultimate recovery rate (Basel) by use-of-proceeds**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibits 5-8 summarize 10-year CDRs (Basel) and average ultimate recovery rates (Basel) by principal industry sector.

**Infrastructure:**

The average 10-year CDR (Basel) for the infrastructure industry sector was 4.2% in our March 2020 study. Infrastructure projects consist mostly of transportation, social and environmental projects.

The 10-year CDR (Basel) for green infrastructure projects is 4.9%, below the 10-year CDR for non-green infrastructure projects of 8.6%, but slightly higher than the 10-year CDR for the total infrastructure industry sector. Social infrastructure projects have the lowest 10-year CDR of 1.1%.

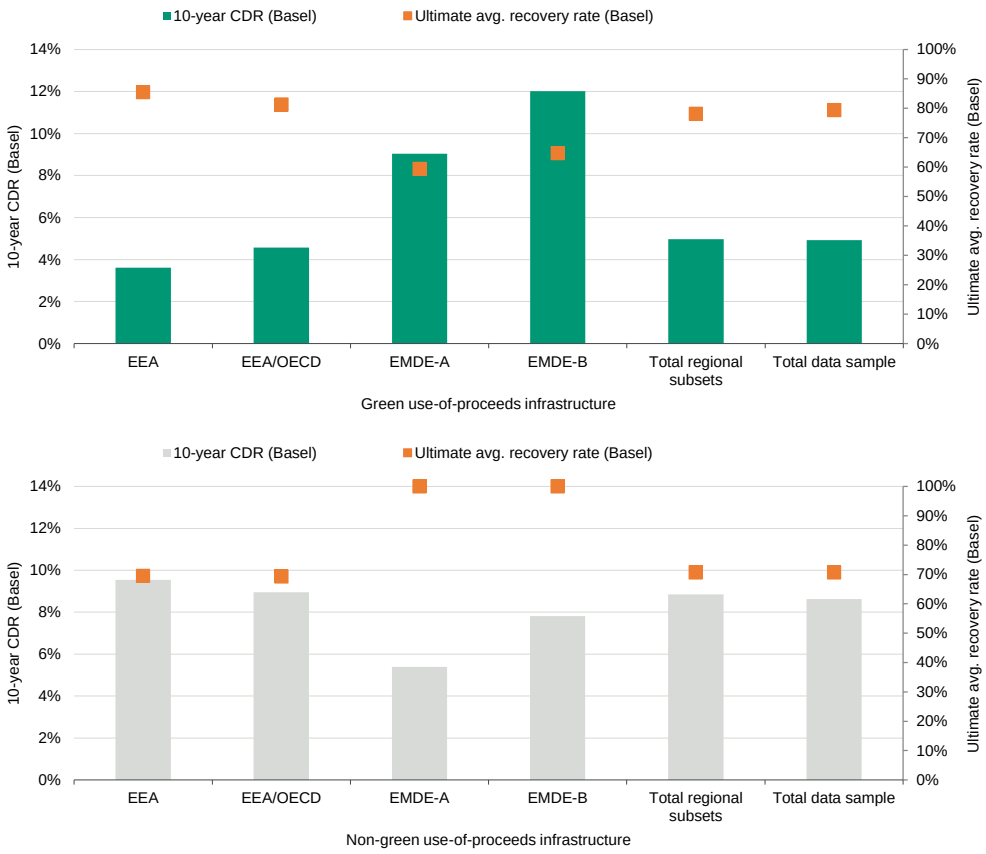
There is a marked difference in the performance of green infrastructure projects in advanced economies versus in the EMDE subsets. In advanced economies, the 10-year CDR for green infrastructure projects ranges from 3.6%-4.6%, benefiting from the low default risk of environmental projects. In EMDEs, the 10-year CDR ranges from 9.0%-12.0% and is high for environmental projects.

Non-green infrastructure projects mostly consist of transportation projects. These projects experienced higher 10-year CDRs in advanced economies than in EMDEs. Transportation projects in Western Europe experienced an increase in defaults in the period 2009-15 following the financial crisis.

Average ultimate recovery rates for the green and non-green infrastructure projects included in the total data sample are 79.4% and 70.7%, respectively. Average ultimate recovery rates can vary by region dependent on the observations in each regional subset.

Exhibit 5

**10-year CDR and ultimate recovery rates for infrastructure projects by regional subsets and use-of-proceeds**

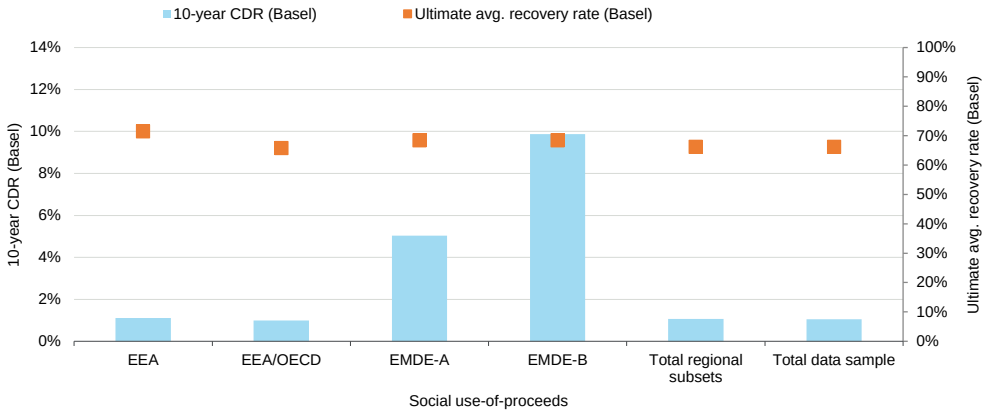



*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 6 summarizes 10-year CDR (Basel) and average ultimate recovery rates by region for social projects.

Exhibit 6

**10-year CDR and ultimate recovery rates for social use-of-proceeds projects by regional subsets**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

**Power:**

The average 10-year CDR (Basel) for the power sector was 5.6% in our March 2020 study. Exhibit 7 summarizes 10-year CDR (Basel) and average ultimate recovery rates by region for green and non-green power projects.

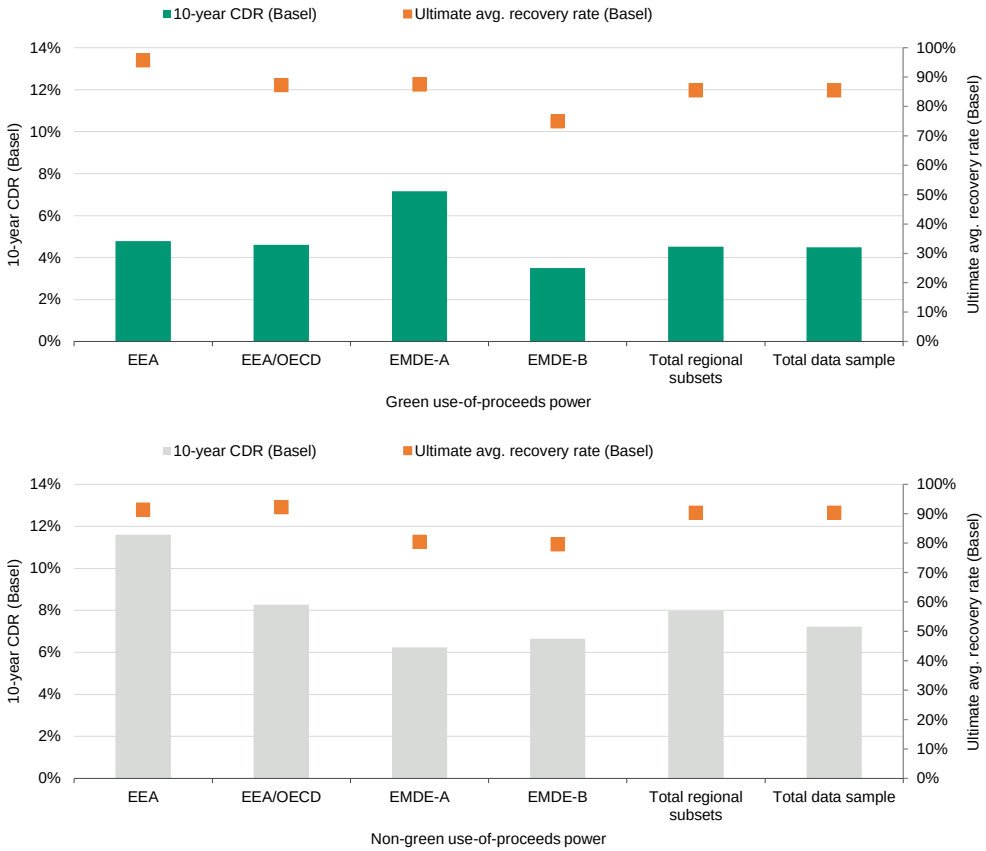
Green power projects have a 10-year CDR of 4.5%, below the 10-year CDR of non-green power projects for the total data sample. The principal driver for this performance is likely the contractual arrangements supporting many renewable power projects, including available subsidies, tax benefits or purchase power agreements.

Power projects that benefit from purchase power agreements are typically not classified as availability-based projects in the total study but often have characteristics that provide greater revenue visibility than for merchant power projects.

Green and non-green power projects have average ultimate recovery rates above the data sample average of 81.5% across most regions. We commented on the high average ultimate recovery rates of the power industry already in our March 2020 study.

Exhibit 7

**10-year CDR and ultimate recovery rates for power projects by regional subsets and use-of-proceeds**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

**Oil and gas:**

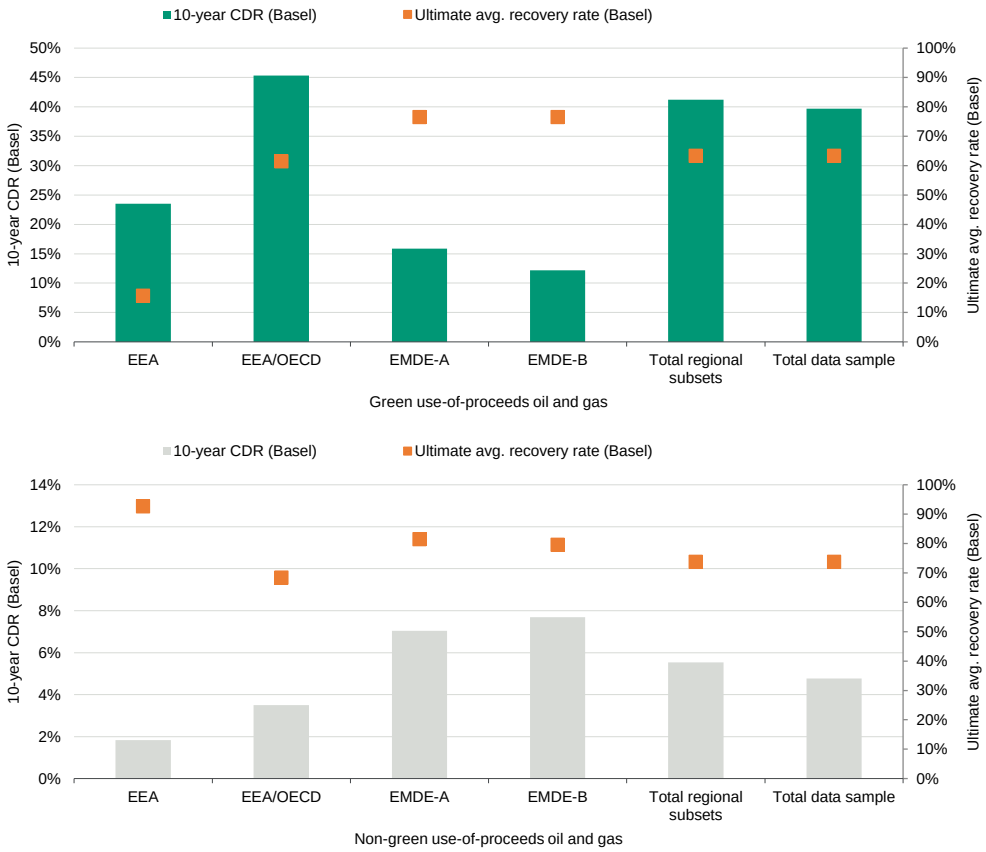
The average 10-year CDR (Basel) for the oil and gas industry sector was 5.9% in our March 2020 study. Exhibit 8 summarizes 10-year CDR (Basel) and average ultimate recovery rates by region for green and non-green oil and gas projects.

The 10-year CDR for green oil and gas projects is 39.7%, compared with 4.8% for non-green oil and gas projects. The very high CDR for green oil and gas projects reflects the default experience of biofuels projects included in the data sample across regions. Many biofuels projects have failed as a result of lower than expected market prices, technical difficulties and inability to achieve the expected operating yields.

Green oil and gas projects (63.4% for total data sample) have one of the lowest average ultimate recovery rates. However, given the low count of observations for green oil and gas projects, a single observation can easily skew the average. For example, the average for green oil and gas includes 16 observations and one ultimate recovery rate of just 15.7% in EEA.

Exhibit 8

**10-year CDR and ultimate recovery rates for oil and gas projects by regional subsets and use-of-proceeds**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 9 summarizes the discussed key findings by region, use-of-proceeds and principal industry sector.

Exhibit 9

Key findings by region, use-of-proceeds and by principal industry sector

| | Project count | Default count (Basel) | Recovery count (Basel) | Avg. ultimate recovery rate (Basel) | 10-year CDR (Basel) | Default count (Moody's) | Recovery count (Moody's) | Avg.ultimate recovery rate (Moody's) | 10-year CDR (Moody's) |
|---|---|---|---|---|---|---|---|---|---|
| **EEA** | **3313** | **188** | **66** | **83.8%** | **4.5%** | **92** | **44** | **79.6%** | **2.1%** |
| Green infrastructure | 320 | 15 | 8 | 85.5% | 3.6% | 10 | 5 | 78.7% | 2.5% |
| Non-green Infrastructure | 566 | 59 | 14 | 69.5% | 9.5% | 25 | 8 | 66.7% | 3.8% |
| Green power | 1167 | 58 | 14 | 95.7% | 4.8% | 22 | 6 | 90.0% | 1.8% |
| Non-green power | 246 | 29 | 20 | 91.4% | 11.6% | 21 | 16 | 89.2% | 6.9% |
| Green oil and gas | 5 | 2 | 1 | 15.7% | 23.5% | 1 | 1 | 15.7% | 9.7% |
| Non-green oil and gas | 174 | 6 | 2 | 92.7% | 1.8% | 5 | 2 | 92.7% | 1.6% |
| Social | 801 | 16 | 6 | 71.4% | 1.1% | 7 | 5 | 65.7% | 0.4% |
| Other | 34 | 3 | 1 | 78.8% | 11.0% | 1 | 1 | 78.8% | 4.2% |
| | | | | | | | | | |
| **EEA/OECD** | **6097** | **367** | **160** | **82.2%** | **5.0%** | **225** | **129** | **79.4%** | **2.9%** |
| Green infrastructure | 428 | 26 | 13 | 81.3% | 4.6% | 20 | 10 | 76.6% | 3.4% |
| Non-green Infrastructure | 821 | 75 | 20 | 69.3% | 9.0% | 36 | 13 | 66.1% | 4.2% |
| Green power | 2037 | 90 | 24 | 87.3% | 4.6% | 42 | 14 | 78.2% | 2.1% |
| Non-green power | 1238 | 113 | 70 | 92.2% | 8.3% | 83 | 60 | 91.2% | 5.7% |
| Green oil and gas | 35 | 19 | 14 | 61.5% | 45.3% | 17 | 14 | 61.5% | 41.8% |
| Non-green oil and gas | 495 | 23 | 11 | 68.4% | 3.5% | 18 | 11 | 68.4% | 3.2% |
| Social | 983 | 17 | 7 | 65.8% | 1.0% | 8 | 6 | 60.1% | 0.4% |
| Other | 60 | 4 | 1 | 78.8% | 9.4% | 1 | 1 | 78.8% | 3.6% |
| | | | | | | | | | |
| **EMDE-A** | **1307** | **112** | **42** | **80.0%** | **6.7%** | **86** | **39** | **80.9%** | **5.3%** |
| Green infrastructure | 52 | 8 | 5 | 59.4% | 9.0% | 8 | 5 | 59.4% | 9.0% |
| Non-green Infrastructure | 160 | 10 | 2 | 100.0% | 5.4% | 7 | 2 | 100.0% | 4.3% |
| Green power | 293 | 23 | 8 | 87.5% | 7.2% | 13 | 7 | 85.7% | 4.4% |
| Non-green power | 350 | 35 | 13 | 80.5% | 6.2% | 31 | 12 | 86.6% | 5.3% |
| Green oil and gas | 7 | 3 | 2 | 76.5% | 15.9% | 2 | 2 | 76.5% | 21.1% |
| Non-green oil and gas | 397 | 30 | 11 | 81.5% | 7.0% | 22 | 10 | 79.6% | 5.2% |
| Social | 32 | 2 | 1 | 68.5% | 5.0% | 2 | 1 | 68.5% | 5.0% |
| Other | 16 | 1 | 0 | n/a | 6.3% | 1 | 0 | n/a | 6.3% |
| | | | | | | | | | |
| **EMDE-B** | **972** | **86** | **33** | **77.8%** | **6.8%** | **73** | **31** | **79.4%** | **6.0%** |
| Green infrastructure | 27 | 5 | 3 | 64.8% | 12.0% | 5 | 3 | 64.8% | 12.0% |
| Non-green Infrastructure | 88 | 8 | 1 | 100.0% | 7.8% | 6 | 1 | 100.0% | 6.9% |
| Green power | 213 | 9 | 4 | 75.0% | 3.5% | 7 | 4 | 75.0% | 3.1% |
| Non-green power | 263 | 31 | 12 | 79.6% | 6.7% | 29 | 11 | 86.2% | 6.2% |
| Green oil and gas | 5 | 2 | 2 | 76.5% | 12.2% | 2 | 2 | 76.5% | 41.7% |
| Non-green oil and gas | 353 | 28 | 10 | 79.6% | 7.7% | 21 | 9 | 77.3% | 5.8% |
| Social | 14 | 2 | 1 | 68.5% | 9.9% | 2 | 1 | 68.5% | 9.9% |
| Other | 9 | 1 | 0 | n/a | 9.9% | 1 | 0 | n/a | 9.9% |
| | | | | | | | | | |
| **Total regional subsets** | **7069** | **453** | **193** | **81.4%** | **5.3%** | **298** | **160** | **79.4%** | **3.3%** |
| Green infrastructure | 455 | 31 | 16 | 78.2% | 5.0% | 25 | 13 | 73.9% | 3.9% |
| Non-green Infrastructure | 909 | 83 | 21 | 70.7% | 8.8% | 42 | 14 | 68.5% | 4.4% |
| Green power | 2250 | 99 | 28 | 85.5% | 4.5% | 49 | 18 | 77.5% | 2.2% |
| Non-green power | 1501 | 144 | 82 | 90.4% | 8.0% | 112 | 71 | 90.4% | 5.8% |
| Green oil and gas | 40 | 21 | 16 | 63.4% | 41.2% | 19 | 16 | 63.4% | 41.8% |
| Non-green oil and gas | 848 | 51 | 21 | 73.8% | 5.5% | 39 | 20 | 72.5% | 4.4% |
| Social | 997 | 19 | 8 | 66.2% | 1.1% | 10 | 7 | 61.3% | 0.5% |
| Other | 69 | 5 | 1 | 78.8% | 9.4% | 2 | 1 | 78.8% | 4.4% |
| | | | | | | | | | |
| **Total data sample** | **7354** | **454** | **194** | **81.5%** | **5.0%** | **299** | **161** | **79.5%** | **3.2%** |
| Green infrastructure | 477 | 32 | 17 | 79.4% | 4.9% | 26 | 14 | 75.7% | 3.9% |
| Non-green Infrastructure | 936 | 83 | 21 | 70.7% | 8.6% | 42 | 14 | 68.5% | 4.3% |
| Green power | 2274 | 99 | 28 | 85.5% | 4.5% | 49 | 18 | 77.5% | 2.1% |
| Non-green power | 1610 | 144 | 82 | 90.4% | 7.2% | 112 | 71 | 90.4% | 5.3% |
| Green oil and gas | 41 | 21 | 16 | 63.4% | 39.7% | 19 | 16 | 63.4% | 40.8% |
| Non-green oil and gas | 936 | 51 | 21 | 73.8% | 4.8% | 39 | 20 | 72.5% | 3.8% |
| Social | 1006 | 19 | 8 | 66.2% | 1.1% | 10 | 7 | 61.3% | 0.4% |
| Other | 74 | 5 | 1 | 78.8% | 8.7% | 2 | 1 | 78.8% | 4.1% |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

## Data overview

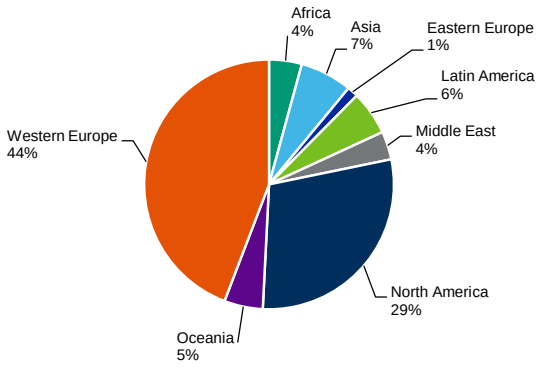
### Composition of the data set by region and revenue resilience characteristics

Exhibit 10 shows that around 73.2% of projects are located in Western Europe and in North America. We summarize key findings by regions shown in Appendix 2: Summary of key findings by region.

Exhibit 11 shows the composition of the data sample by revenue resilience characteristics. Around 24.9% of projects are availability-based projects. We summarize key findings in Appendix 1: Summary of findings for projects with different revenue characteristics.

Exhibit 10

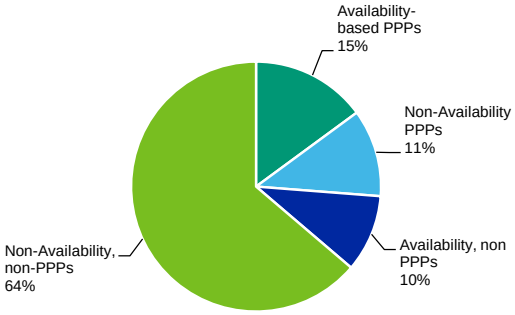
**Composition of projects for the total data sample by region**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 11

**Composition of projects for the total data sample by different revenue resilience characteristics**



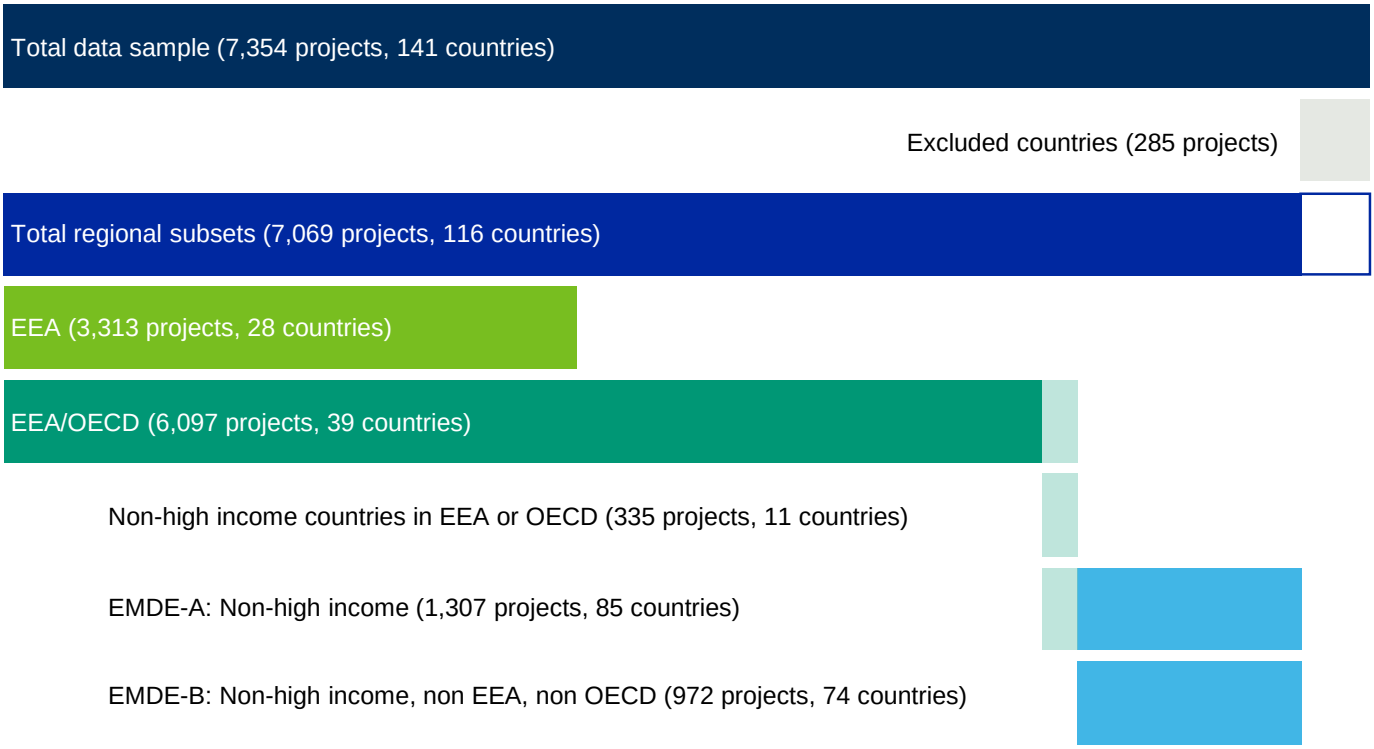

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 12 shows the data sample classified by two advanced economies and two emerging market and developing economies (EMDEs) regional subsets:

1. Advanced economies subsets:
    a. EEA: Includes projects located in countries in the European Economic Area (EEA).
    b. EEA/OECD subset: Includes projects located in either EEA countries or in OECD member states. Projects located in countries within the EEA or OECD may qualify for lower regulatory capital under Solvency II, the European regulatory regime for insurers.
2. EMDEs
    a. EMDE-A: A subset comprising projects located in countries that the WBG classified as non-high-income (upper-middle-income, lower-middle-income or low-income), on average over the period 1995-2018. We exclude certain US dependent territories.
    b. EMDE-B: A subset comprising projects in the EMDE-A subset, but excluding non-high-income EEA countries and non-high-income OECD countries. The 11 non-high-income countries in the EEA/OECD regions are: Bulgaria, Chile, Croatia, Czech Republic, Hungary, Lithuania, Mexico, Poland, Romania, Turkey, Slovakia. We exclude these countries from the EMDE-B subsets.

Exhibit 12

**Composition of total data sample by advanced economies/EMDE subsets**




Note: EEA refers to European Economic Area; EMDE refers to emerging market and developing economies; the 11 non-high-income countries in the EEA/OECD regions are: Bulgaria, Chile, Croatia, Czech Republic, Hungary, Lithuania, Mexico, Poland, Romania, Turkey, Slovakia. These are excluded from the EMDE-B subset.
*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

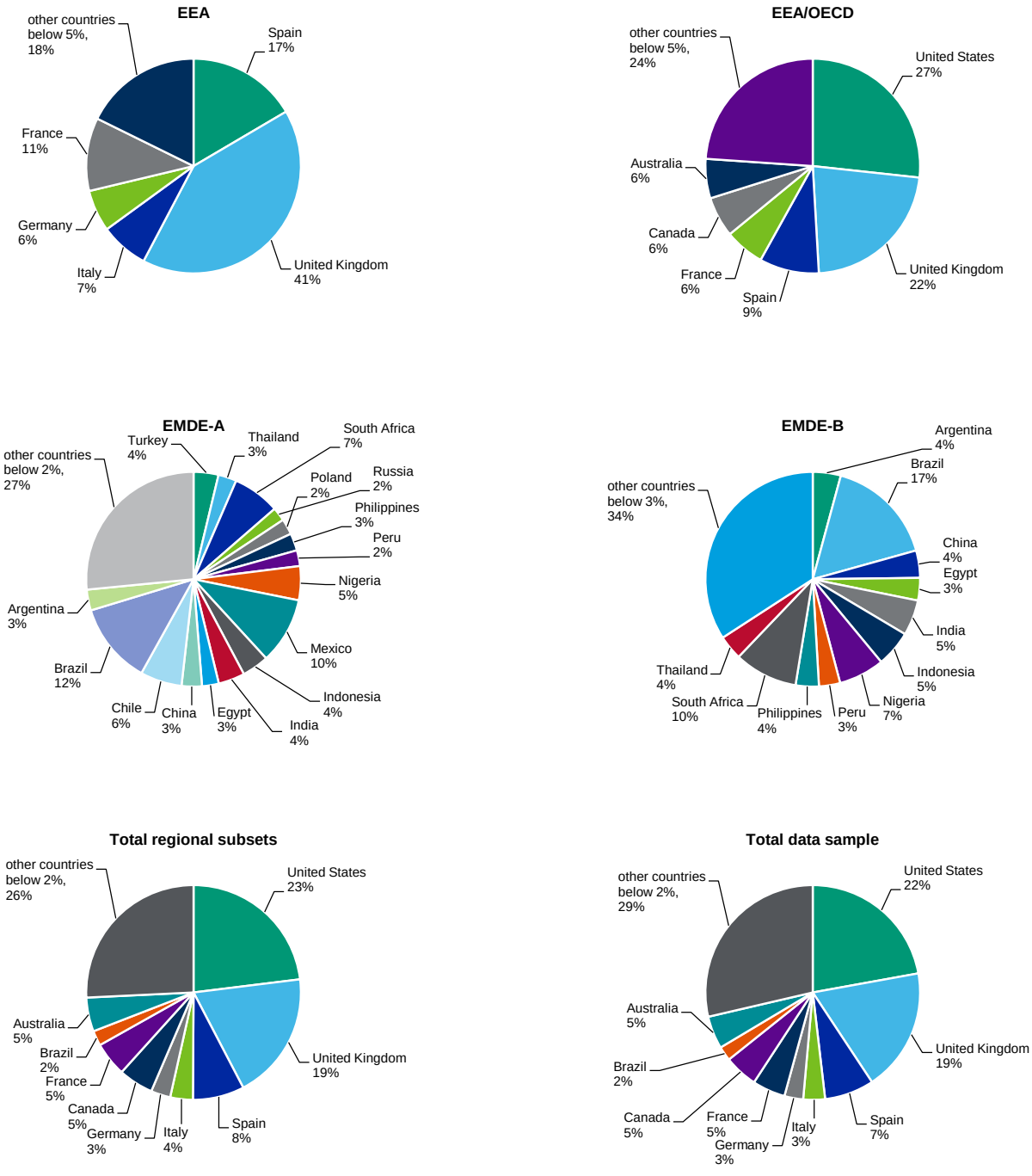
## Distribution of projects and defaults by region

### Distribution of projects by country

Exhibit 13 shows that in advanced economies projects are highly concentrated in the US, the UK, Spain, France, Canada and Australia. Regional concentration is less prevalent in EMDEs.

Exhibit 13

**Distributions of projects by country**



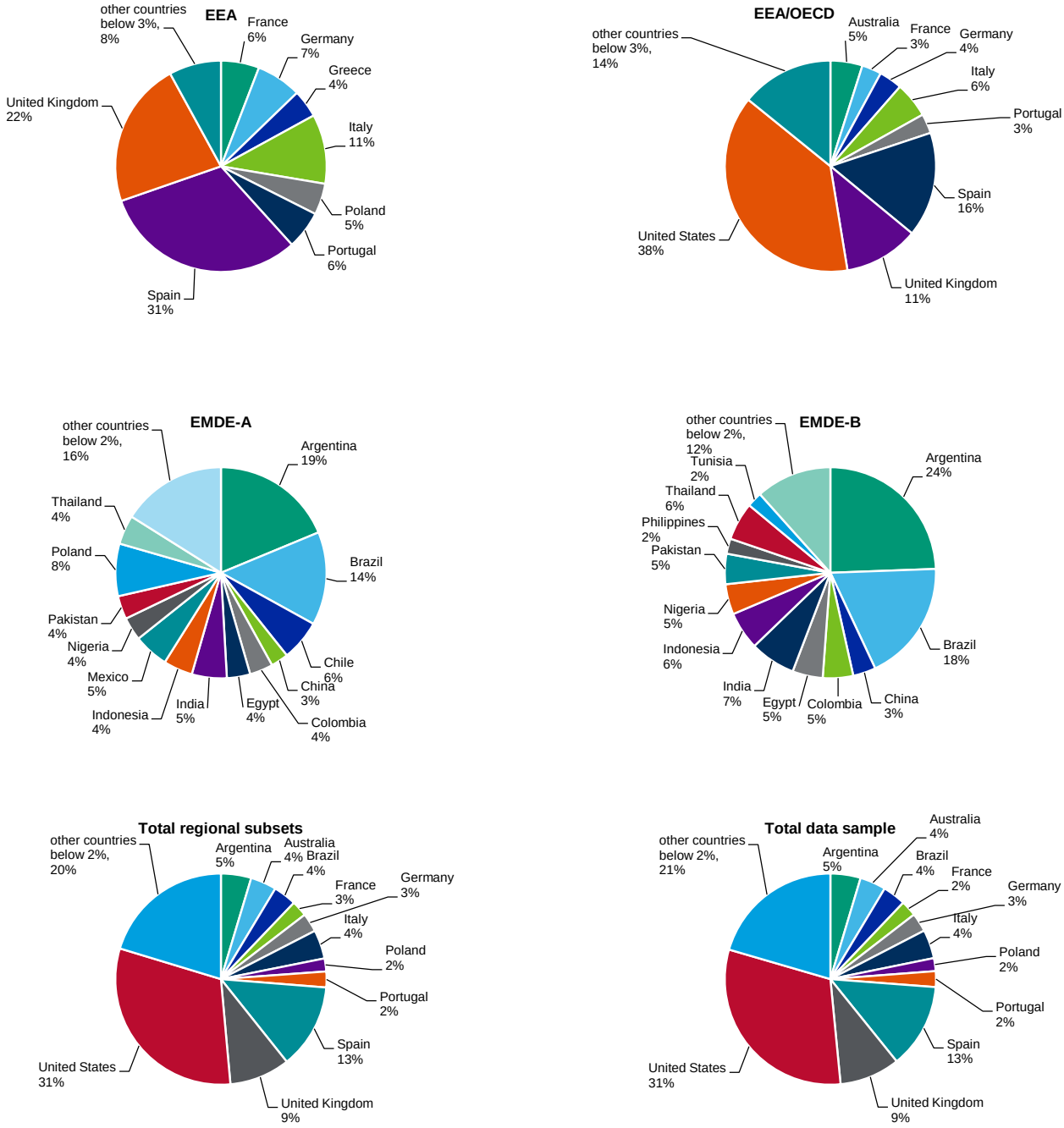

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

**Distribution of defaults by country**

Exhibit 14 shows that defaults in advanced economies are concentrated in the US, the UK, Spain and Italy. Defaults in the EMDE subsets show a higher count of defaults in Argentina and Brazil.

Exhibit 14

**Distribution of defaults by country**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

**Incidence of projects originated by region**

Exhibit 15 tabulates the number of projects originated by regional subsets during the period 1983-2018. Around 89.7% of projects were originated since 2000.

Origination activity was highest in 2007. The 2008-09 financial crisis led to a substantial contraction in origination across regional subsets. In the years following the financial crisis, origination of project finance bank loans remained more subdued in EEA, but recovered faster in other OECD countries and in the EMDE subsets. In the EMDE subsets, origination peaked during the years 2012-2015, but has remained fairly subdued since then.

Exhibit 15 reflects the origination activity of the Data Consortium. The study data set accounts for approximately 67.1% of the larger Refinitiv Project Finance International industry data set from 1983 to 2018. For the study data set, the share of projects originated in the most recent calendar year has often been understated because of delays in data submission. We expect that the share of projects originated in 2018 will rise when we next update our annual study. Total debt raised for global project finance transactions reached a record $288 billion in 2018, a 23.9% increase from 2017 levels, based on data from Refinitiv Project Finance International.

Exhibit 15

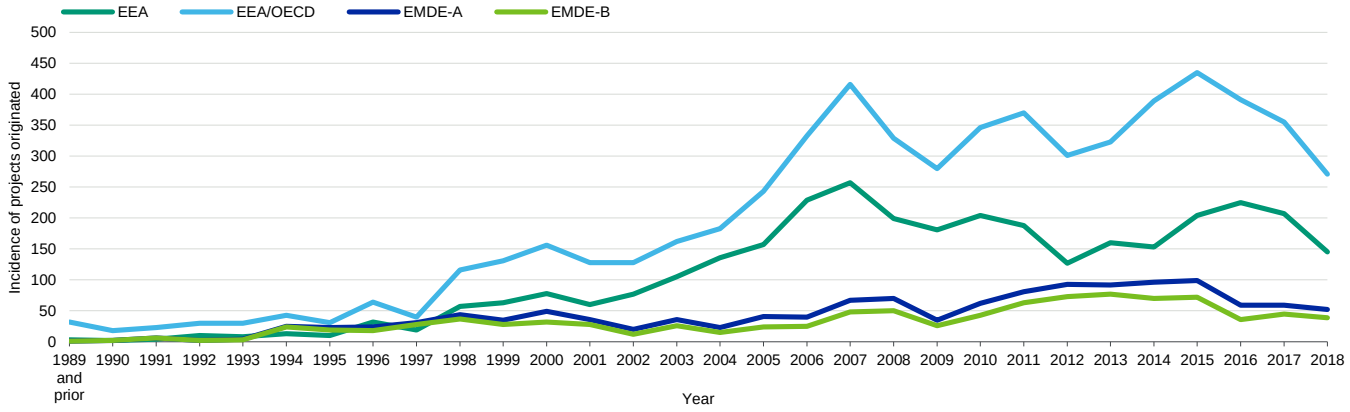
**Incidence of projects originated**

| Year | EEA | EEA/OECD | EMDE-A | EMDE-B | Total regional subsets | Total data sample |
|---|---|---|---|---|---|---|
| 1989 and prior | 3 | 32 | 1 | 1 | 33 | 36 |
| 1990 | 2 | 18 | 2 | 2 | 20 | 20 |
| 1991 | 4 | 23 | 6 | 6 | 29 | 29 |
| 1992 | 10 | 30 | 2 | 2 | 32 | 32 |
| 1993 | 8 | 30 | 4 | 3 | 33 | 35 |
| 1994 | 13 | 43 | 25 | 24 | 67 | 69 |
| 1995 | 10 | 31 | 23 | 19 | 50 | 54 |
| 1996 | 32 | 64 | 24 | 18 | 82 | 88 |
| 1997 | 19 | 40 | 31 | 28 | 68 | 76 |
| 1998 | 57 | 116 | 44 | 37 | 153 | 155 |
| 1999 | 63 | 131 | 35 | 28 | 159 | 167 |
| 2000 | 78 | 156 | 49 | 32 | 188 | 195 |
| 2001 | 60 | 128 | 36 | 28 | 156 | 167 |
| 2002 | 77 | 128 | 20 | 12 | 140 | 145 |
| 2003 | 105 | 162 | 36 | 26 | 188 | 195 |
| 2004 | 136 | 183 | 23 | 15 | 198 | 207 |
| 2005 | 157 | 243 | 41 | 24 | 267 | 284 |
| 2006 | 229 | 333 | 40 | 25 | 358 | 377 |
| 2007 | 257 | 416 | 67 | 48 | 464 | 490 |
| 2008 | 199 | 329 | 70 | 50 | 379 | 393 |
| 2009 | 181 | 280 | 35 | 26 | 306 | 323 |
| 2010 | 204 | 346 | 62 | 43 | 389 | 398 |
| 2011 | 188 | 370 | 81 | 63 | 433 | 450 |
| 2012 | 127 | 301 | 93 | 73 | 374 | 386 |
| 2013 | 160 | 323 | 92 | 77 | 400 | 414 |
| 2014 | 153 | 389 | 96 | 70 | 459 | 476 |
| 2015 | 204 | 435 | 99 | 72 | 507 | 523 |
| 2016 | 225 | 391 | 59 | 36 | 427 | 439 |
| 2017 | 207 | 355 | 59 | 45 | 400 | 410 |
| 2018 | 145 | 271 | 52 | 39 | 310 | 321 |
| **Total** | **3313** | **6097** | **1307** | **972** | **7069** | **7354** |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 16

**Incidence of projects originated**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

**Cumulative active projects by region**

Exhibit 17 shows the cumulative active projects by region based on the Basel definition of default. Cumulative active projects are an integral input to our calculation methodology for marginal and cumulative annual default rates.

### Methodology for calculating cumulative and marginal default rates

The cumulative default rate calculation methodology that we use is a discrete-time approximation of the nonparametric continuous-time hazard rate approach. We form a static pool cohort based on the number of active projects on January 1 of each year. We track the default and survival status of the cohort members from 1990 to 2018. Projects that are active on January 1 of each cohort year include loans originated from the commencement of the study period in 1983.

The monthly marginal default rate (hazard rate) is the probability that a project that has survived in the cohort up to the beginning of a particular month will default by the end of that month. We calculate the marginal default rate as the ratio of defaults in that month to the number of surviving projects at the beginning of that month. We exclude projects that have been repaid during that month from the count of survivors in subsequent time intervals.

We derive cumulative default rates for each cohort from monthly marginal default rates for that cohort. Average cumulative default rates for all cohorts 1990-2018 are derived from the weighted average marginal default rates from all the available cohort marginal default rates (1990-2018). In other words, monthly marginal default rates are weighted by the relevant number of active projects at the start of year t for that cohort. Average annual marginal default rates (1990-2018) are derived from average cumulative default rates (1990-2018).

The cohort-based methodology used in this report analyzes the default experience of a cohort over a certain time horizon. This is in contrast to the vintage approach of calculating marginal and cumulative annual default rates which relates default experience to the specific tenor of a credit. The vintage approach is often used for structured finance securities such as mortgage-backed securities (MBS) but it does require larger sample sizes for each vintage year to allow for robust conclusions.

Exhibit 17

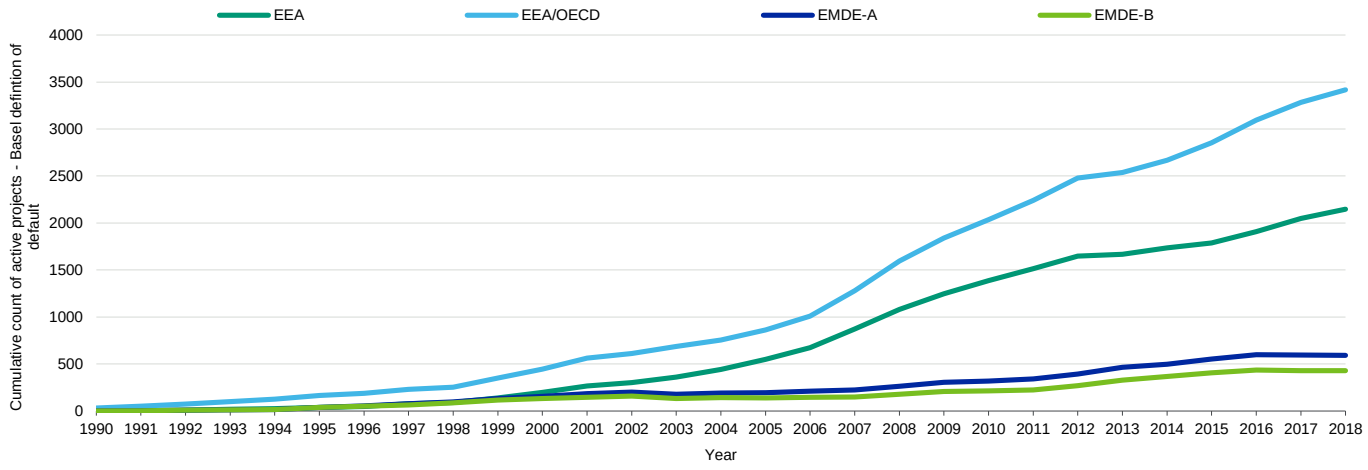
**Cumulative active projects by region (Basel definition of default)**

| Year | EEA | EEA/OECD | EMDE-A | EMDE-B | Total regional subsets | Total data sample |
|---|---|---|---|---|---|---|
| 1990 | 3 | 32 | 1 | 1 | 33 | 36 |
| 1991 | 5 | 50 | 3 | 3 | 53 | 56 |
| 1992 | 9 | 73 | 9 | 9 | 82 | 85 |
| 1993 | 19 | 100 | 11 | 11 | 111 | 114 |
| 1994 | 26 | 127 | 15 | 14 | 141 | 146 |
| 1995 | 39 | 167 | 39 | 37 | 204 | 211 |
| 1996 | 47 | 188 | 56 | 50 | 238 | 249 |
| 1997 | 77 | 232 | 78 | 66 | 298 | 315 |
| 1998 | 90 | 254 | 98 | 86 | 340 | 365 |
| 1999 | 140 | 350 | 134 | 115 | 465 | 490 |
| 2000 | 197 | 447 | 157 | 132 | 579 | 611 |
| 2001 | 266 | 563 | 184 | 146 | 709 | 747 |
| 2002 | 303 | 613 | 200 | 159 | 772 | 819 |
| 2003 | 362 | 686 | 178 | 132 | 818 | 863 |
| 2004 | 441 | 755 | 193 | 143 | 898 | 949 |
| 2005 | 551 | 864 | 194 | 140 | 1004 | 1058 |
| 2006 | 674 | 1008 | 212 | 146 | 1154 | 1216 |
| 2007 | 874 | 1279 | 223 | 148 | 1427 | 1498 |
| 2008 | 1081 | 1597 | 264 | 180 | 1777 | 1867 |
| 2009 | 1247 | 1839 | 307 | 209 | 2048 | 2147 |
| 2010 | 1387 | 2034 | 319 | 215 | 2249 | 2358 |
| 2011 | 1515 | 2240 | 341 | 225 | 2465 | 2574 |
| 2012 | 1647 | 2479 | 394 | 271 | 2750 | 2871 |
| 2013 | 1667 | 2538 | 464 | 327 | 2865 | 2988 |
| 2014 | 1735 | 2667 | 499 | 369 | 3036 | 3165 |
| 2015 | 1788 | 2852 | 552 | 408 | 3260 | 3400 |
| 2016 | 1909 | 3094 | 599 | 436 | 3530 | 3682 |
| 2017 | 2047 | 3284 | 597 | 430 | 3714 | 3867 |
| 2018 | 2147 | 3417 | 591 | 430 | 3847 | 4002 |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 18

**Cumulative active projects by region (Basel)**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

**Incidence of defaults**

Exhibit 19 shows the count of defaults by regional subsets and by year. It also shows the count of defaults as a percentage of active projects and as a percentage of total defaults by regional subsets.

Defaults peaked in 2002 as a percentage of active projects and as a percentage of total defaults across all regional subsets. This period of high defaults coincided with several credit events across the globe. Examples include the stock market crash of 2002, the US energy crisis of 2000-01 and sovereign crises in Latin America and Asia arising from the occurrence of a systemic banking crisis, currency crisis or sovereign debt crisis. In EMDE-A and EMDE-B 19 of the 25 defaults in 2002 occurred in Argentina. Please see our March 2020 study for more details.

The exhibit also highlights that the incidence of defaults as a percentage of active projects is low for the years 2008-16, reflecting the growth in cumulative active projects.

Similarly, we have observed a spike in defaults for rated infrastructure securities in 2002-03 and a less pronounced increase during the 2009 financial crisis than for nonfinancial corporates. Please see our report "Defaults & recoveries: Fewer coronavirus-driven downgrades than nonfinancial corporates" from June 2020.

Exhibit 19

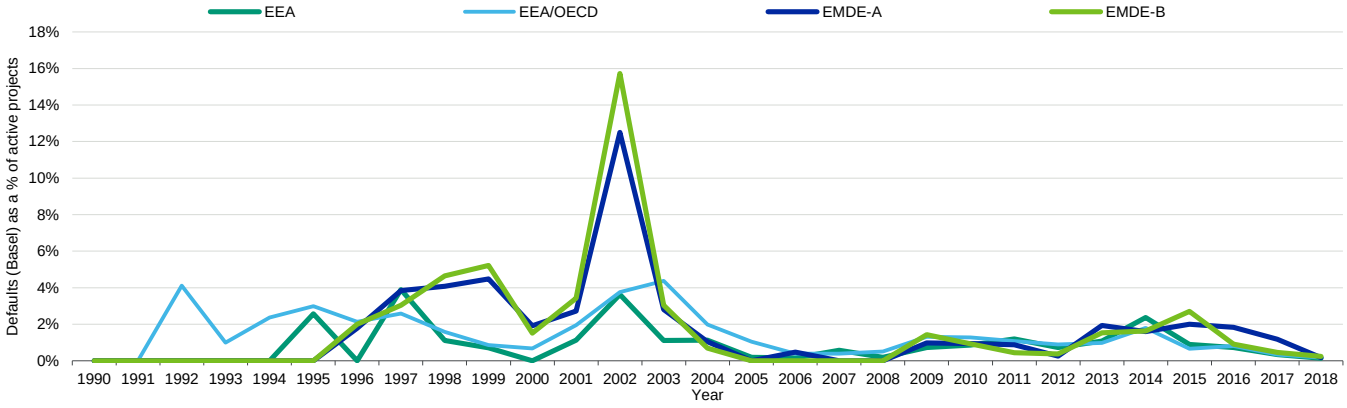
**Incidence of default by year and as a percentage of active projects (Basel)**

| Year | EEA | | | EEA/OECD | | | EMDE-A | | | EMDE-B | | | Total data sample | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Defaults | % of active projects | % of total defaults | Defaults | % of active projects | % of total defaults | Defaults | % of active projects | % of total defaults | Defaults | % of active projects | % of total defaults | Defaults | % of active projects | % of total defaults |
| 1990 | 0 | 0.0% | 0.0% | 0 | 0.0% | 0.0% | 0 | 0.0% | 0.0% | 0 | 0.0% | 0.0% | 0 | 0.0% | 0.0% |
| 1991 | 0 | 0.0% | 0.0% | 0 | 0.0% | 0.0% | 0 | 0.0% | 0.0% | 0 | 0.0% | 0.0% | 0 | 0.0% | 0.0% |
| 1992 | 0 | 0.0% | 0.0% | 3 | 4.1% | 0.8% | 0 | 0.0% | 0.0% | 0 | 0.0% | 0.0% | 3 | 3.5% | 0.7% |
| 1993 | 0 | 0.0% | 0.0% | 1 | 1.0% | 0.3% | 0 | 0.0% | 0.0% | 0 | 0.0% | 0.0% | 1 | 0.9% | 0.2% |
| 1994 | 0 | 0.0% | 0.0% | 3 | 2.4% | 0.8% | 0 | 0.0% | 0.0% | 0 | 0.0% | 0.0% | 3 | 2.1% | 0.7% |
| 1995 | 1 | 2.6% | 0.5% | 5 | 3.0% | 1.4% | 0 | 0.0% | 0.0% | 0 | 0.0% | 0.0% | 5 | 2.4% | 1.1% |
| 1996 | 0 | 0.0% | 0.0% | 4 | 2.1% | 1.1% | 1 | 1.8% | 0.9% | 1 | 2.0% | 1.2% | 5 | 2.0% | 1.1% |
| 1997 | 3 | 3.9% | 1.6% | 6 | 2.6% | 1.6% | 3 | 3.8% | 2.7% | 2 | 3.0% | 2.3% | 8 | 2.5% | 1.8% |
| 1998 | 1 | 1.1% | 0.5% | 4 | 1.6% | 1.1% | 4 | 4.1% | 3.6% | 4 | 4.7% | 4.7% | 8 | 2.2% | 1.8% |
| 1999 | 1 | 0.7% | 0.5% | 3 | 0.9% | 0.8% | 6 | 4.5% | 5.4% | 6 | 5.2% | 7.0% | 9 | 1.8% | 2.0% |
| 2000 | 0 | 0.0% | 0.0% | 3 | 0.7% | 0.8% | 3 | 1.9% | 2.7% | 2 | 1.5% | 2.3% | 5 | 0.8% | 1.1% |
| 2001 | 3 | 1.1% | 1.6% | 11 | 2.0% | 3.0% | 5 | 2.7% | 4.5% | 5 | 3.4% | 5.8% | 16 | 2.1% | 3.5% |
| 2002 | 11 | 3.6% | 5.9% | 23 | 3.8% | 6.3% | 25 | 12.5% | 22.3% | 25 | 15.7% | 29.1% | 48 | 5.9% | 10.6% |
| 2003 | 4 | 1.1% | 2.1% | 30 | 4.4% | 8.2% | 5 | 2.8% | 4.5% | 4 | 3.0% | 4.7% | 34 | 3.9% | 7.5% |
| 2004 | 5 | 1.1% | 2.7% | 15 | 2.0% | 4.1% | 2 | 1.0% | 1.8% | 1 | 0.7% | 1.2% | 16 | 1.7% | 3.5% |
| 2005 | 1 | 0.2% | 0.5% | 9 | 1.0% | 2.5% | 0 | 0.0% | 0.0% | 0 | 0.0% | 0.0% | 9 | 0.9% | 2.0% |
| 2006 | 1 | 0.1% | 0.5% | 4 | 0.4% | 1.1% | 1 | 0.5% | 0.9% | 0 | 0.0% | 0.0% | 4 | 0.3% | 0.9% |
| 2007 | 5 | 0.6% | 2.7% | 5 | 0.4% | 1.4% | 0 | 0.0% | 0.0% | 0 | 0.0% | 0.0% | 5 | 0.3% | 1.1% |
| 2008 | 2 | 0.2% | 1.1% | 8 | 0.5% | 2.2% | 0 | 0.0% | 0.0% | 0 | 0.0% | 0.0% | 8 | 0.4% | 1.8% |
| 2009 | 9 | 0.7% | 4.8% | 24 | 1.3% | 6.5% | 3 | 1.0% | 2.7% | 3 | 1.4% | 3.5% | 27 | 1.3% | 5.9% |
| 2010 | 12 | 0.9% | 6.4% | 26 | 1.3% | 7.1% | 3 | 0.9% | 2.7% | 2 | 0.9% | 2.3% | 29 | 1.2% | 6.4% |
| 2011 | 18 | 1.2% | 9.6% | 24 | 1.1% | 6.5% | 3 | 0.9% | 2.7% | 1 | 0.4% | 1.2% | 25 | 1.0% | 5.5% |
| 2012 | 12 | 0.7% | 6.4% | 22 | 0.9% | 6.0% | 1 | 0.3% | 0.9% | 1 | 0.4% | 1.2% | 23 | 0.8% | 5.1% |
| 2013 | 18 | 1.1% | 9.6% | 25 | 1.0% | 6.8% | 9 | 1.9% | 8.0% | 5 | 1.5% | 5.8% | 30 | 1.0% | 6.6% |
| 2014 | 41 | 2.4% | 21.8% | 48 | 1.8% | 13.1% | 8 | 1.6% | 7.1% | 6 | 1.6% | 7.0% | 54 | 1.7% | 11.9% |
| 2015 | 16 | 0.9% | 8.5% | 19 | 0.7% | 5.2% | 11 | 2.0% | 9.8% | 11 | 2.7% | 12.8% | 30 | 0.9% | 6.6% |
| 2016 | 14 | 0.7% | 7.4% | 25 | 0.8% | 6.8% | 11 | 1.8% | 9.8% | 4 | 0.9% | 4.7% | 29 | 0.8% | 6.4% |
| 2017 | 7 | 0.3% | 3.7% | 11 | 0.3% | 3.0% | 7 | 1.2% | 6.3% | 2 | 0.5% | 2.3% | 13 | 0.3% | 2.9% |
| 2018 | 3 | 0.1% | 1.6% | 6 | 0.2% | 1.6% | 1 | 0.2% | 0.9% | 1 | 0.2% | 1.2% | 7 | 0.2% | 1.5% |
| **Total** | **188** | | | **367** | | | **112** | | | **86** | | | **454** | | |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 20

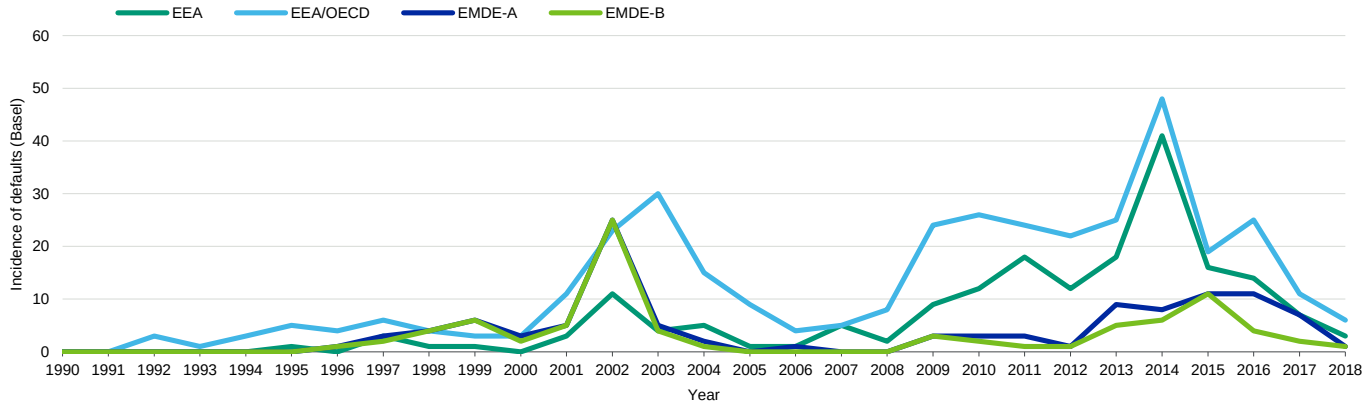
**Incidence of default as a percentage of active projects by region (Basel)**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 21

**Incidence of default by region (Basel)**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 22 shows the default experience of origination cohorts. The origination cohorts 1999-2001, 2006-08 and before 1997 include a higher percentage of defaulted projects than other cohorts.

The lower percentage of projects defaulting by origination cohorts in most recent years may be supported by a more benign credit cycle, further development of project finance as an asset class across regions and enhanced structural protections that reduce default risk. However, we might also see an increase in defaults of more recent origination cohorts in the next few years as more data is added to the study.

Exhibit 22

**Percentage of defaults by year of origination year cohorts**

| Year | Basel definition of default | | Moody's definition of default | |
|---|---|---|---|---|
| | Count of projects originated | % of projects defaulting | Count of projects originated | % of projects defaulting |
| 1989 & prior | 36 | 25.0% | 36 | 25.0% |
| 1990 | 20 | 20.0% | 20 | 10.0% |
| 1991 | 29 | 10.3% | 29 | 10.3% |
| 1992 | 32 | 12.5% | 32 | 9.4% |
| 1993 | 35 | 22.9% | 35 | 20.0% |
| 1994 | 69 | 14.5% | 69 | 14.5% |
| 1995 | 54 | 16.7% | 54 | 11.1% |
| 1996 | 88 | 22.7% | 88 | 20.5% |
| 1997 | 76 | 11.8% | 76 | 11.8% |
| 1998 | 155 | 7.7% | 155 | 7.1% |
| 1999 | 167 | 12.6% | 167 | 7.8% |
| 2000 | 195 | 15.4% | 195 | 11.8% |
| 2001 | 167 | 20.4% | 167 | 16.8% |
| 2002 | 145 | 6.9% | 145 | 3.4% |
| 2003 | 195 | 6.7% | 195 | 4.6% |
| 2004 | 207 | 4.3% | 207 | 2.4% |
| 2005 | 284 | 5.3% | 284 | 1.4% |
| 2006 | 377 | 10.3% | 377 | 6.6% |
| 2007 | 490 | 9.0% | 490 | 6.1% |
| 2008 | 393 | 11.5% | 393 | 7.1% |
| 2009 | 323 | 4.0% | 323 | 2.2% |
| 2010 | 398 | 6.5% | 398 | 3.5% |
| 2011 | 450 | 5.8% | 450 | 2.4% |
| 2012 | 386 | 2.8% | 386 | 0.8% |
| 2013 | 414 | 3.9% | 414 | 2.9% |
| 2014 | 476 | 0.6% | 476 | 0.0% |
| 2015 | 523 | 1.9% | 523 | 0.8% |
| 2016 | 439 | 0.2% | 439 | 0.0% |
| 2017 | 410 | 0.0% | 410 | 0.0% |
| 2018 | 321 | 0.0% | 321 | 0.0% |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

## Default rate analysis

### Marginal annual default rates

We present first the findings for the total data sample by region, second by region and by use-of-proceeds and third by region, use-of-proceeds and industry.

**Marginal annual default rates for the total data sample by region**

Annual marginal default rates (Basel and Moody's) across regional subsets are highest in the first few years from cohort formation and decline over time. They are similar to Moody's marginal annual default rates for single-A rated corporates by year seven from cohort formation. Regional differences between marginal default rates diminish by year seven once a project has completed construction and has an initial operating track record.

This seasoning characteristic of project finance bank loans is different from marginal annual default rates that we have observed for investment-grade corporate issuers, which are broadly stable.

Exhibit 23 presents marginal annual default rates (Basel) by regional subsets for a 10 year time horizon. For reference, Exhibit 23 includes marginal annual default rates by Moody's-rated corporate bond and loan issuers for certain rating categories, based on our definition of default.

Exhibit 23

**Summary of marginal annual default rates by regional subsets (Basel)**

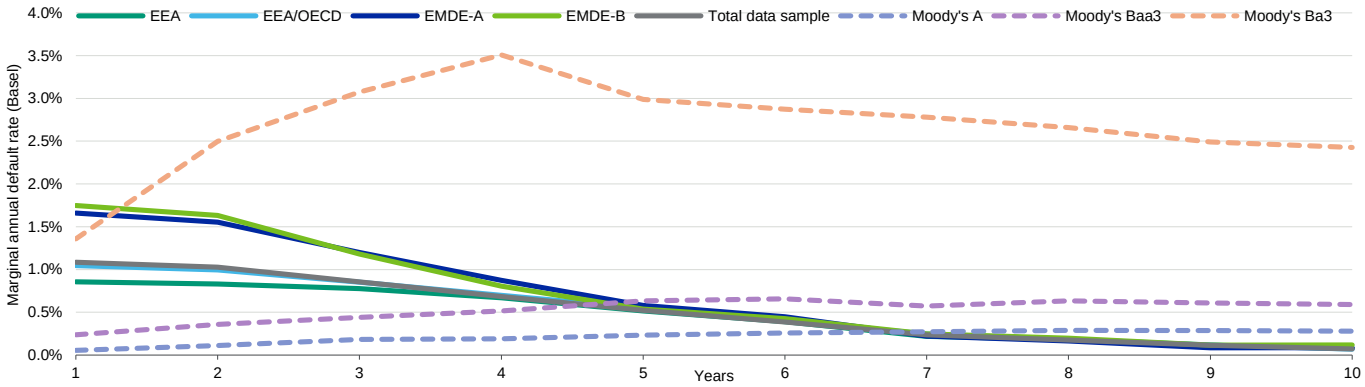
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| EEA | 0.86% | 0.83% | 0.78% | 0.67% | 0.52% | 0.39% | 0.22% | 0.18% | 0.11% | 0.08% |
| EEA/OECD | 1.05% | 1.00% | 0.85% | 0.70% | 0.55% | 0.40% | 0.25% | 0.18% | 0.12% | 0.07% |
| EMDE-A | 1.66% | 1.55% | 1.20% | 0.87% | 0.58% | 0.45% | 0.22% | 0.17% | 0.08% | 0.09% |
| EMDE-B | 1.75% | 1.63% | 1.18% | 0.80% | 0.54% | 0.43% | 0.25% | 0.20% | 0.12% | 0.12% |
| Total regional subsets | 1.13% | 1.07% | 0.89% | 0.71% | 0.54% | 0.41% | 0.25% | 0.18% | 0.12% | 0.07% |
| Total data sample | 1.08% | 1.03% | 0.85% | 0.68% | 0.52% | 0.39% | 0.24% | 0.18% | 0.11% | 0.07% |
| | | | | | | | | | | |
| Africa | 0.83% | 0.80% | 0.54% | 0.56% | 0.49% | 0.51% | 0.35% | 0.27% | 0.27% | 0.28% |
| Asia | 0.86% | 0.84% | 0.70% | 0.35% | 0.28% | 0.21% | 0.09% | 0.09% | 0.00% | 0.00% |
| Eastern Europe | 2.25% | 2.45% | 2.69% | 2.53% | 1.85% | 1.50% | 0.26% | 0.27% | 0.00% | 0.00% |
| Latin America | 2.75% | 2.48% | 1.63% | 1.09% | 0.47% | 0.28% | 0.15% | 0.15% | 0.08% | 0.08% |
| Middle East | 0.06% | 0.06% | 0.06% | 0.07% | 0.07% | 0.07% | 0.07% | 0.00% | 0.00% | 0.00% |
| North America | 1.55% | 1.46% | 1.10% | 0.83% | 0.67% | 0.49% | 0.35% | 0.20% | 0.15% | 0.07% |
| Oceania | 1.13% | 1.05% | 1.02% | 0.95% | 0.85% | 0.51% | 0.32% | 0.22% | 0.12% | 0.00% |
| Western Europe | 0.82% | 0.79% | 0.73% | 0.63% | 0.48% | 0.36% | 0.22% | 0.18% | 0.12% | 0.08% |
| Total data sample | 1.08% | 1.03% | 0.85% | 0.68% | 0.52% | 0.39% | 0.24% | 0.18% | 0.11% | 0.07% |
| | | | | | | | | | | |
| Moody's A | 0.06% | 0.11% | 0.18% | 0.19% | 0.23% | 0.26% | 0.27% | 0.29% | 0.29% | 0.28% |
| Moody's Baa | 0.17% | 0.27% | 0.31% | 0.37% | 0.38% | 0.40% | 0.38% | 0.38% | 0.38% | 0.42% |
| Moody's Baa3 | 0.24% | 0.36% | 0.44% | 0.52% | 0.63% | 0.66% | 0.57% | 0.64% | 0.61% | 0.59% |
| Moody's Ba1 | 0.43% | 0.99% | 1.23% | 1.23% | 1.31% | 1.23% | 0.98% | 0.80% | 0.81% | 0.94% |
| Moody's Ba2 | 0.74% | 1.20% | 1.40% | 1.44% | 1.35% | 1.10% | 1.08% | 1.25% | 1.44% | 1.53% |
| Moody's Ba3 | 1.36% | 2.50% | 3.07% | 3.51% | 2.99% | 2.88% | 2.78% | 2.66% | 2.49% | 2.43% |

Comparative marginal default rate data for corporates is derived from cumulative default rate data in Moody's Sector In-Depth report, "Annual default study: Defaults will rise modestly in 2019 amid higher volatility" February 2019, Exhibit 43 and Exhibit 44 for the period 1983-2018. It is based on the Moody's definition of default.
*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 24 charts marginal annual default rates (Basel) by regional subsets shown in Exhibit 23.

Exhibit 24

**Marginal annual default rates (Basel)**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 25 presents marginal annual default rates (Moody's) by regional subsets based on a 10 year time horizon. Moody's marginal annual default rates tend to be lower than those based on the Basel definition of default. The data sample includes a lower number of Moody's defaults in the infrastructure and power industry sector.

Exhibit 25

**Summary of marginal annual default rates by regional subsets (Moody's)**

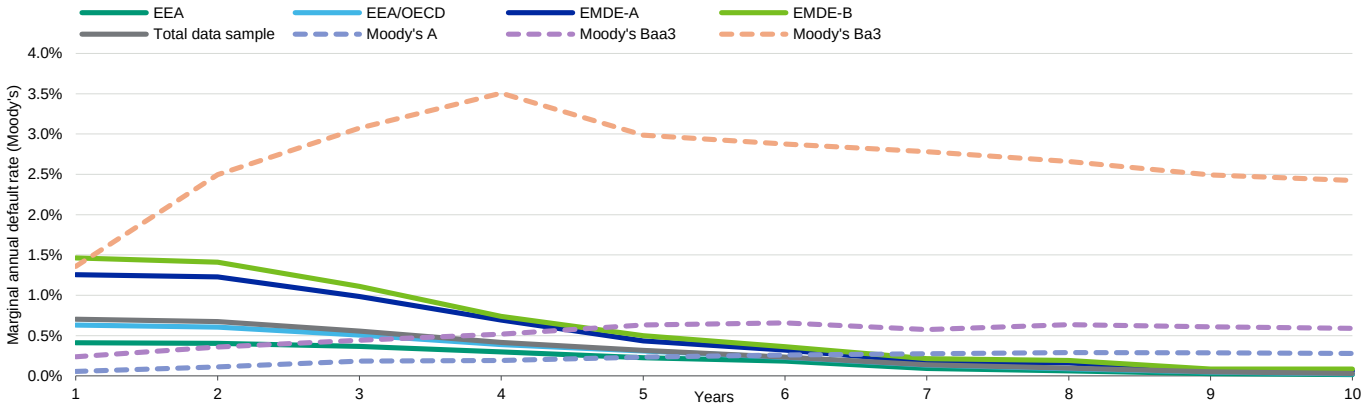
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| EEA | 0.41% | 0.41% | 0.37% | 0.30% | 0.22% | 0.18% | 0.09% | 0.06% | 0.03% | 0.02% |
| EEA/OECD | 0.63% | 0.61% | 0.51% | 0.39% | 0.31% | 0.23% | 0.13% | 0.09% | 0.05% | 0.02% |
| EMDE-A | 1.26% | 1.23% | 0.99% | 0.69% | 0.43% | 0.32% | 0.17% | 0.16% | 0.06% | 0.06% |
| EMDE-B | 1.46% | 1.41% | 1.11% | 0.74% | 0.50% | 0.36% | 0.21% | 0.19% | 0.08% | 0.09% |
| Total regional subsets | 0.73% | 0.70% | 0.58% | 0.43% | 0.33% | 0.24% | 0.14% | 0.10% | 0.05% | 0.03% |
| Total data sample | 0.70% | 0.67% | 0.56% | 0.41% | 0.32% | 0.23% | 0.14% | 0.10% | 0.05% | 0.03% |
| | | | | | | | | | | |
| Africa | 0.69% | 0.72% | 0.53% | 0.39% | 0.40% | 0.33% | 0.26% | 0.17% | 0.18% | 0.18% |
| Asia | 0.76% | 0.77% | 0.66% | 0.34% | 0.28% | 0.21% | 0.08% | 0.09% | 0.00% | 0.00% |
| Eastern Europe | 1.10% | 1.18% | 1.27% | 1.38% | 0.85% | 0.68% | 0.23% | 0.24% | 0.00% | 0.00% |
| Latin America | 2.24% | 2.08% | 1.58% | 1.11% | 0.52% | 0.34% | 0.21% | 0.21% | 0.07% | 0.07% |
| Middle East | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| North America | 1.12% | 1.06% | 0.83% | 0.59% | 0.51% | 0.36% | 0.26% | 0.16% | 0.11% | 0.05% |
| Oceania | 0.92% | 0.89% | 0.84% | 0.84% | 0.74% | 0.40% | 0.21% | 0.22% | 0.11% | 0.00% |
| Western Europe | 0.40% | 0.39% | 0.35% | 0.28% | 0.21% | 0.17% | 0.09% | 0.06% | 0.03% | 0.02% |
| Total data sample | 0.70% | 0.67% | 0.56% | 0.41% | 0.32% | 0.23% | 0.14% | 0.10% | 0.05% | 0.03% |
| | | | | | | | | | | |
| Moody's A | 0.06% | 0.11% | 0.18% | 0.19% | 0.23% | 0.26% | 0.27% | 0.29% | 0.29% | 0.28% |
| Moody's Baa | 0.17% | 0.27% | 0.31% | 0.37% | 0.38% | 0.40% | 0.38% | 0.38% | 0.38% | 0.42% |
| Moody's Baa3 | 0.24% | 0.36% | 0.44% | 0.52% | 0.63% | 0.66% | 0.57% | 0.64% | 0.61% | 0.59% |
| Moody's Ba1 | 0.43% | 0.99% | 1.23% | 1.23% | 1.31% | 1.23% | 0.98% | 0.80% | 0.81% | 0.94% |
| Moody's Ba2 | 0.74% | 1.20% | 1.40% | 1.44% | 1.35% | 1.10% | 1.08% | 1.25% | 1.44% | 1.53% |
| Moody's Ba3 | 1.36% | 2.50% | 3.07% | 3.51% | 2.99% | 2.88% | 2.78% | 2.66% | 2.49% | 2.43% |

Comparative marginal default rate data for corporates is derived from cumulative default rate data in Moody's Sector In-Depth report, "Annual default study: Defaults will rise modestly in 2019 amid higher volatility" February 2019, Exhibit 43 and Exhibit 44 for the period 1983-2018.
*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 26 charts marginal annual default rates (Moody's) by regional subset shown in Exhibit 25.

Exhibit 26

**Marginal annual default rates (Moody's)**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

**Marginal annual default rates for the total data sample by region and use-of-proceeds**

Exhibit 27 presents marginal annual default rates (Basel) by regional subsets and by use-of-proceeds.

Exhibit 27

**Marginal annual default rates (Basel) by use-of-proceeds**

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| EEA | 0.86% | 0.83% | 0.78% | 0.67% | 0.52% | 0.39% | 0.22% | 0.18% | 0.11% | 0.08% |
| Green use-of-proceeds | 0.85% | 0.84% | 0.81% | 0.74% | 0.55% | 0.44% | 0.20% | 0.11% | 0.04% | 0.04% |
| Non-green use-of-proceeds | 1.63% | 1.63% | 1.51% | 1.29% | 1.02% | 0.77% | 0.47% | 0.48% | 0.36% | 0.22% |
| Social | 0.22% | 0.20% | 0.17% | 0.13% | 0.10% | 0.07% | 0.07% | 0.07% | 0.05% | 0.03% |
| Other | 1.50% | 1.64% | 1.79% | 1.95% | 2.15% | 0.81% | 0.84% | 0.87% | 0.00% | 0.00% |
| | | | | | | | | | | |
| EEA/OECD | 1.05% | 1.00% | 0.85% | 0.70% | 0.55% | 0.40% | 0.25% | 0.18% | 0.12% | 0.07% |
| Green use-of-proceeds | 1.01% | 0.96% | 0.87% | 0.72% | 0.55% | 0.43% | 0.23% | 0.14% | 0.08% | 0.06% |
| Non-green use-of-proceeds | 1.60% | 1.56% | 1.31% | 1.09% | 0.88% | 0.64% | 0.41% | 0.32% | 0.24% | 0.11% |
| Social | 0.20% | 0.18% | 0.15% | 0.11% | 0.09% | 0.06% | 0.06% | 0.07% | 0.04% | 0.03% |
| Other | 1.54% | 1.67% | 1.81% | 1.46% | 1.57% | 0.57% | 0.59% | 0.60% | 0.00% | 0.00% |
| | | | | | | | | | | |
| EMDE-A | 1.66% | 1.55% | 1.20% | 0.87% | 0.58% | 0.45% | 0.22% | 0.17% | 0.08% | 0.09% |
| Green use-of-proceeds | 2.10% | 1.82% | 1.49% | 1.13% | 0.72% | 0.52% | 0.07% | 0.08% | 0.00% | 0.00% |
| Non-green use-of-proceeds | 1.52% | 1.46% | 1.10% | 0.77% | 0.55% | 0.44% | 0.29% | 0.21% | 0.12% | 0.13% |
| Social | 1.63% | 1.70% | 0.88% | 0.91% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Other | 1.49% | 1.59% | 1.67% | 1.75% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| | | | | | | | | | | |
| EMDE-B | 1.75% | 1.63% | 1.18% | 0.80% | 0.54% | 0.43% | 0.25% | 0.20% | 0.12% | 0.12% |
| Green use-of-proceeds | 1.49% | 1.26% | 0.81% | 0.62% | 0.42% | 0.22% | 0.11% | 0.11% | 0.00% | 0.00% |
| Non-green use-of-proceeds | 1.79% | 1.70% | 1.27% | 0.82% | 0.59% | 0.51% | 0.31% | 0.24% | 0.16% | 0.16% |
| Social | 3.23% | 3.39% | 1.79% | 1.85% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Other | 2.38% | 2.50% | 2.63% | 2.78% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| | | | | | | | | | | |
| Total regional subsets | 1.13% | 1.07% | 0.89% | 0.71% | 0.54% | 0.41% | 0.25% | 0.18% | 0.12% | 0.07% |
| Green use-of-proceeds | 1.05% | 0.98% | 0.86% | 0.71% | 0.54% | 0.41% | 0.22% | 0.14% | 0.08% | 0.06% |
| Non-green use-of-proceeds | 1.64% | 1.59% | 1.30% | 1.03% | 0.81% | 0.61% | 0.38% | 0.30% | 0.22% | 0.13% |
| Social | 0.23% | 0.21% | 0.16% | 0.12% | 0.09% | 0.06% | 0.06% | 0.06% | 0.04% | 0.03% |
| Other | 1.65% | 1.79% | 1.93% | 1.66% | 1.33% | 0.48% | 0.49% | 0.50% | 0.00% | 0.00% |
| | | | | | | | | | | |
| Total data sample | 1.08% | 1.03% | 0.85% | 0.68% | 0.52% | 0.39% | 0.24% | 0.18% | 0.11% | 0.07% |
| Green use-of-proceeds | 1.04% | 0.98% | 0.86% | 0.71% | 0.53% | 0.41% | 0.22% | 0.14% | 0.07% | 0.06% |
| Non-green use-of-proceeds | 1.50% | 1.45% | 1.19% | 0.94% | 0.74% | 0.56% | 0.35% | 0.27% | 0.20% | 0.11% |
| Social | 0.23% | 0.20% | 0.16% | 0.12% | 0.09% | 0.06% | 0.06% | 0.06% | 0.04% | 0.03% |
| Other | 1.52% | 1.64% | 1.77% | 1.52% | 1.23% | 0.44% | 0.45% | 0.46% | 0.00% | 0.00% |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 28 charts marginal annual default rates (Basel) by use-of-proceeds for the total data sample:

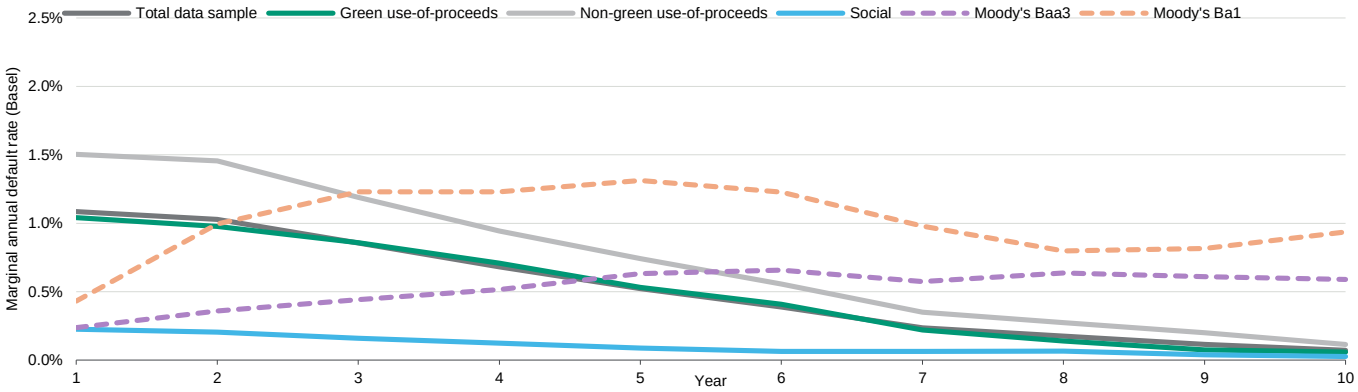
» Social projects have the lowest marginal annual default rates (Basel), well below the total data sample. All social projects are availability-based projects, which tend to benefit from greater revenue visibility and lower default risk if the offtaker is credit worthy.

» Green projects have lower marginal annual default rates (Basel) than non-green projects, but higher marginal default rates than social projects.

» Marginal annual default rates (Basel) decline over time across subsets and the differential in marginal annual default rates between the green, non-green and social use-of-proceeds subsets decreases with time.

Exhibit 28

**Marginal default rates (Basel) for total data sample by use-of-proceeds**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 29 charts marginal annual default rates (Basel) for green use-of-proceeds projects by regional subsets:

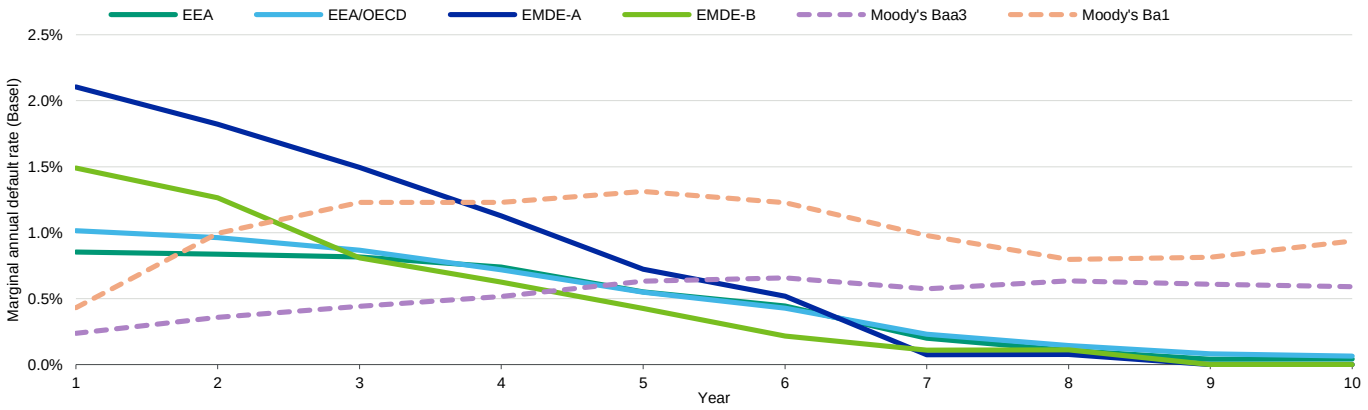
» Green projects have lower marginal annual default rates (Basel) in the advanced economies subsets EEA and EEA/OECD, and in EMDE-B compared with the EMDE-A subset.

» The EMDE-A subset includes a higher count of defaults in Poland, Mexico, Romania and Chile, which are not included in the EMDE-B subset.

» Marginal annual default rates (Basel) in the EMDE subsets are initially higher than in advanced economies, but regional differences diminish by year seven.

Exhibit 29

**Marginal default rates (Basel) for green use-of-proceeds project by regional subsets**



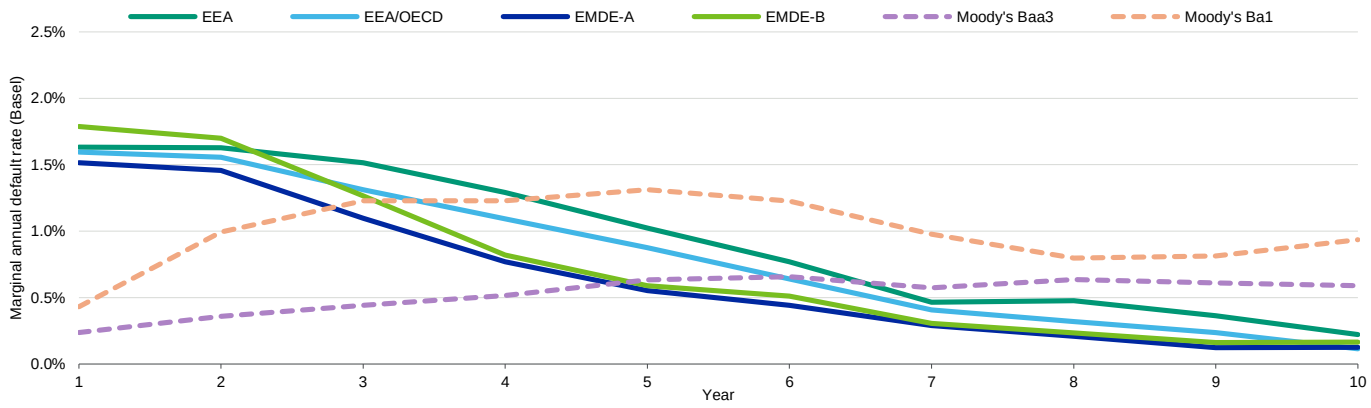

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 30 charts marginal annual default rates (Basel) for non-green use-of-proceeds projects by regional subsets:

» Marginal annual default rates (Basel) show less variation by regional subsets for non-green projects.

Exhibit 30

**Marginal default rates (Basel) for non-green use-of-proceeds projects by regional subsets**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

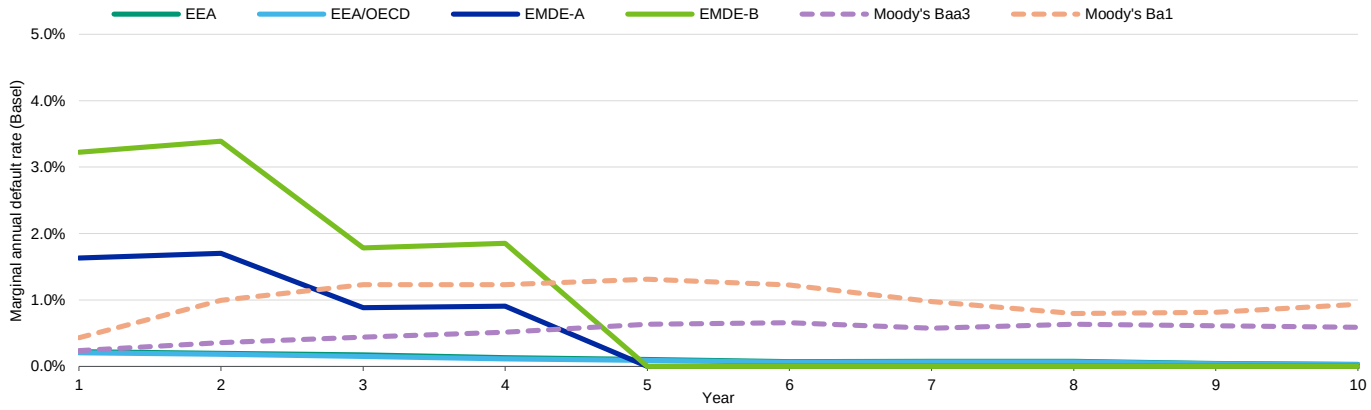
Exhibit 31 charts marginal annual default rates (Basel) for social use-of-proceeds projects by regional subsets:

» Social projects have exceptionally low marginal annual default rates in advanced economy subsets, but initially high marginal annual default rates in the EMDE subsets.

» However, less than 5% of social projects were originated in the EMDE subsets. This highlights that not many emerging markets have financed social projects such as hospital or schools through the use of project finance bank loans. The use of availability-based payment projects is more limited in EMDEs. We discuss projects with different revenue resilience characteristics in Appendix 1: Summary of findings for projects with different revenue characteristics.

Exhibit 31

**Marginal default rates (Basel) for social use-of-proceeds projects by regional subsets**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 32 presents marginal annual default rates (Moody's) by regional subsets and by use-of-proceeds. Moody's marginal annual default rates tend to be lower across subsets than based on the Basel definition of default.

Exhibit 32

**Marginal annual default rates (Moody's) by use-of-proceeds**

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| EEA | 0.41% | 0.41% | 0.37% | 0.30% | 0.22% | 0.18% | 0.09% | 0.06% | 0.03% | 0.02% |
| Green use-of-proceeds | 0.37% | 0.37% | 0.35% | 0.31% | 0.23% | 0.20% | 0.09% | 0.04% | 0.01% | 0.01% |
| Non-green use-of-proceeds | 0.85% | 0.87% | 0.78% | 0.60% | 0.46% | 0.35% | 0.17% | 0.13% | 0.07% | 0.04% |
| Social | 0.10% | 0.08% | 0.06% | 0.04% | 0.03% | 0.03% | 0.03% | 0.03% | 0.01% | 0.00% |
| Other | 0.47% | 0.47% | 0.47% | 0.47% | 0.47% | 0.48% | 0.48% | 0.48% | 0.48% | 0.00% |
| | | | | | | | | | | |
| EEA/OECD | 0.63% | 0.61% | 0.51% | 0.39% | 0.31% | 0.23% | 0.13% | 0.09% | 0.05% | 0.02% |
| Green use-of-proceeds | 0.58% | 0.57% | 0.50% | 0.37% | 0.28% | 0.23% | 0.13% | 0.07% | 0.04% | 0.03% |
| Non-green use-of-proceeds | 1.01% | 0.99% | 0.83% | 0.66% | 0.54% | 0.38% | 0.22% | 0.15% | 0.08% | 0.03% |
| Social | 0.10% | 0.09% | 0.05% | 0.04% | 0.03% | 0.03% | 0.03% | 0.03% | 0.01% | 0.00% |
| Other | 0.37% | 0.40% | 0.42% | 0.45% | 0.47% | 0.49% | 0.50% | 0.51% | 0.00% | 0.00% |
| | | | | | | | | | | |
| EMDE-A | 1.26% | 1.23% | 0.99% | 0.69% | 0.43% | 0.32% | 0.17% | 0.16% | 0.06% | 0.06% |
| Green use-of-proceeds | 1.39% | 1.32% | 1.18% | 0.88% | 0.48% | 0.35% | 0.14% | 0.14% | 0.00% | 0.00% |
| Non-green use-of-proceeds | 1.20% | 1.18% | 0.91% | 0.60% | 0.43% | 0.32% | 0.20% | 0.17% | 0.09% | 0.09% |
| Social | 1.63% | 1.70% | 0.88% | 0.91% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Other | 1.49% | 1.59% | 1.67% | 1.75% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| | | | | | | | | | | |
| EMDE-B | 1.46% | 1.41% | 1.11% | 0.74% | 0.50% | 0.36% | 0.21% | 0.19% | 0.08% | 0.09% |
| Green use-of-proceeds | 1.28% | 1.14% | 0.99% | 0.72% | 0.52% | 0.32% | 0.22% | 0.22% | 0.00% | 0.00% |
| Non-green use-of-proceeds | 1.47% | 1.44% | 1.12% | 0.70% | 0.50% | 0.39% | 0.22% | 0.19% | 0.12% | 0.12% |
| Social | 3.23% | 3.39% | 1.79% | 1.85% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Other | 2.38% | 2.50% | 2.63% | 2.78% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| | | | | | | | | | | |
| Total regional subsets | 0.73% | 0.70% | 0.58% | 0.43% | 0.33% | 0.24% | 0.14% | 0.10% | 0.05% | 0.03% |
| Green use-of-proceeds | 0.64% | 0.61% | 0.54% | 0.40% | 0.30% | 0.23% | 0.13% | 0.08% | 0.04% | 0.03% |
| Non-green use-of-proceeds | 1.11% | 1.09% | 0.89% | 0.67% | 0.53% | 0.38% | 0.22% | 0.16% | 0.09% | 0.05% |
| Social | 0.12% | 0.11% | 0.06% | 0.05% | 0.03% | 0.03% | 0.03% | 0.03% | 0.01% | 0.00% |
| Other | 0.63% | 0.68% | 0.71% | 0.76% | 0.40% | 0.42% | 0.43% | 0.43% | 0.00% | 0.00% |
| | | | | | | | | | | |
| Total data sample | 0.70% | 0.67% | 0.56% | 0.41% | 0.32% | 0.23% | 0.14% | 0.10% | 0.05% | 0.03% |
| Green use-of-proceeds | 0.63% | 0.61% | 0.54% | 0.40% | 0.29% | 0.23% | 0.13% | 0.08% | 0.04% | 0.03% |
| Non-green use-of-proceeds | 1.02% | 1.00% | 0.81% | 0.61% | 0.49% | 0.35% | 0.20% | 0.15% | 0.08% | 0.05% |
| Social | 0.12% | 0.11% | 0.06% | 0.05% | 0.02% | 0.03% | 0.03% | 0.03% | 0.01% | 0.00% |
| Other | 0.58% | 0.62% | 0.66% | 0.70% | 0.38% | 0.39% | 0.40% | 0.40% | 0.00% | 0.00% |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

**Marginal annual default rates for the total data sample by region, use-of-proceeds and industry**

Exhibit 33 presents marginal annual default rates (Basel) by use-of-proceeds, by principal industry sector and by region. We further segment the use-of-proceeds subsets by the three principal industry sectors: infrastructure, power and oil and gas. The more limited observations by industry subsets will constrain conclusions but provides, nonetheless, additional insight.

We comment in more detail on the default experience by industry subsector in our analysis of cumulative default rates.

Exhibit 33

**Marginal annual default rates (Basel) by use-of-proceeds and industry**

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| EEA | 0.86% | 0.83% | 0.78% | 0.67% | 0.52% | 0.39% | 0.22% | 0.18% | 0.11% | 0.08% |
| Green infrastructure | 0.66% | 0.64% | 0.61% | 0.63% | 0.45% | 0.31% | 0.21% | 0.16% | 0.00% | 0.00% |
| Non-green infrastructure | 1.65% | 1.65% | 1.60% | 1.42% | 1.10% | 0.79% | 0.53% | 0.54% | 0.40% | 0.29% |
| Green power | 0.89% | 0.88% | 0.85% | 0.78% | 0.59% | 0.49% | 0.20% | 0.09% | 0.05% | 0.05% |
| Non-green power | 2.09% | 2.13% | 1.90% | 1.69% | 1.42% | 1.19% | 0.58% | 0.60% | 0.51% | 0.13% |
| Green oil and gas | 7.56% | 8.52% | 9.52% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Non-green oil and gas | 0.74% | 0.67% | 0.44% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Social | 0.22% | 0.20% | 0.17% | 0.13% | 0.10% | 0.07% | 0.07% | 0.07% | 0.05% | 0.03% |
| EEA/OECD | 1.05% | 1.00% | 0.85% | 0.70% | 0.55% | 0.40% | 0.25% | 0.18% | 0.12% | 0.07% |
| Green infrastructure | 0.90% | 0.83% | 0.75% | 0.70% | 0.56% | 0.37% | 0.25% | 0.21% | 0.04% | 0.04% |
| Non-green infrastructure | 1.59% | 1.58% | 1.52% | 1.35% | 1.04% | 0.73% | 0.52% | 0.45% | 0.31% | 0.23% |
| Green power | 0.87% | 0.84% | 0.81% | 0.71% | 0.53% | 0.44% | 0.22% | 0.13% | 0.09% | 0.07% |
| Non-green power | 1.73% | 1.73% | 1.37% | 1.12% | 0.92% | 0.70% | 0.41% | 0.31% | 0.24% | 0.05% |
| Green oil and gas | 15.33% | 17.68% | 12.26% | 3.31% | 3.64% | 2.00% | 2.08% | 0.00% | 0.00% | 0.00% |
| Non-green oil and gas | 1.14% | 0.93% | 0.60% | 0.32% | 0.27% | 0.21% | 0.07% | 0.00% | 0.00% | 0.00% |
| Social | 0.20% | 0.18% | 0.15% | 0.11% | 0.09% | 0.06% | 0.06% | 0.07% | 0.04% | 0.03% |
| EMDE-A | 1.66% | 1.55% | 1.20% | 0.87% | 0.58% | 0.45% | 0.22% | 0.17% | 0.08% | 0.09% |
| Green infrastructure | 2.53% | 2.35% | 1.77% | 0.74% | 0.77% | 0.40% | 0.41% | 0.42% | 0.00% | 0.00% |
| Non-green infrastructure | 1.08% | 1.15% | 0.97% | 0.77% | 0.53% | 0.42% | 0.14% | 0.15% | 0.15% | 0.15% |
| Green power | 1.82% | 1.65% | 1.37% | 1.24% | 0.73% | 0.56% | 0.00% | 0.00% | 0.00% | 0.00% |
| Non-green power | 1.77% | 1.69% | 1.23% | 0.62% | 0.53% | 0.35% | 0.14% | 0.08% | 0.00% | 0.00% |
| Green oil and gas | 9.29% | 3.57% | 3.85% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Non-green oil and gas | 1.47% | 1.38% | 1.03% | 0.91% | 0.59% | 0.55% | 0.51% | 0.37% | 0.23% | 0.24% |
| Social | 1.63% | 1.70% | 0.88% | 0.91% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| EMDE-B | 1.75% | 1.63% | 1.18% | 0.80% | 0.54% | 0.43% | 0.25% | 0.20% | 0.12% | 0.12% |
| Green infrastructure | 2.88% | 2.47% | 1.98% | 1.40% | 1.48% | 0.79% | 0.82% | 0.85% | 0.00% | 0.00% |
| Non-green infrastructure | 1.60% | 1.69% | 1.33% | 0.93% | 0.73% | 0.75% | 0.26% | 0.26% | 0.27% | 0.27% |
| Green power | 1.02% | 1.05% | 0.61% | 0.50% | 0.25% | 0.13% | 0.00% | 0.00% | 0.00% | 0.00% |
| Non-green power | 2.17% | 2.03% | 1.38% | 0.51% | 0.45% | 0.29% | 0.00% | 0.00% | 0.00% | 0.00% |
| Green oil and gas | 12.16% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Non-green oil and gas | 1.54% | 1.44% | 1.16% | 1.03% | 0.66% | 0.62% | 0.57% | 0.42% | 0.26% | 0.26% |
| Social | 3.23% | 3.39% | 1.79% | 1.85% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Total regional subsets | 1.13% | 1.07% | 0.89% | 0.71% | 0.54% | 0.41% | 0.25% | 0.18% | 0.12% | 0.07% |
| Green infrastructure | 1.01% | 0.92% | 0.82% | 0.74% | 0.61% | 0.39% | 0.28% | 0.24% | 0.04% | 0.04% |
| Non-green infrastructure | 1.59% | 1.59% | 1.50% | 1.31% | 1.01% | 0.73% | 0.50% | 0.43% | 0.31% | 0.23% |
| Green power | 0.89% | 0.85% | 0.80% | 0.69% | 0.51% | 0.41% | 0.20% | 0.12% | 0.09% | 0.06% |
| Non-green power | 1.81% | 1.79% | 1.37% | 1.01% | 0.84% | 0.62% | 0.33% | 0.25% | 0.20% | 0.04% |
| Green oil and gas | 14.95% | 15.46% | 10.43% | 2.76% | 2.99% | 1.61% | 1.67% | 0.00% | 0.00% | 0.00% |
| Non-green oil and gas | 1.33% | 1.17% | 0.87% | 0.67% | 0.46% | 0.41% | 0.31% | 0.20% | 0.12% | 0.12% |
| Social | 0.23% | 0.21% | 0.16% | 0.12% | 0.09% | 0.06% | 0.06% | 0.06% | 0.04% | 0.03% |
| Total data sample | 1.08% | 1.03% | 0.85% | 0.68% | 0.52% | 0.39% | 0.24% | 0.18% | 0.11% | 0.07% |
| Green infrastructure | 1.01% | 0.92% | 0.82% | 0.74% | 0.58% | 0.37% | 0.27% | 0.23% | 0.04% | 0.04% |
| Non-green infrastructure | 1.55% | 1.54% | 1.46% | 1.28% | 0.99% | 0.71% | 0.49% | 0.42% | 0.30% | 0.23% |
| Green power | 0.88% | 0.85% | 0.79% | 0.69% | 0.50% | 0.41% | 0.20% | 0.12% | 0.08% | 0.06% |
| Non-green power | 1.65% | 1.62% | 1.24% | 0.91% | 0.75% | 0.55% | 0.30% | 0.22% | 0.18% | 0.04% |
| Green oil and gas | 14.29% | 14.72% | 9.90% | 2.63% | 2.88% | 1.56% | 1.64% | 0.00% | 0.00% | 0.00% |
| Non-green oil and gas | 1.15% | 1.01% | 0.75% | 0.57% | 0.39% | 0.35% | 0.27% | 0.17% | 0.10% | 0.11% |
| Social | 0.23% | 0.20% | 0.16% | 0.12% | 0.09% | 0.06% | 0.06% | 0.06% | 0.04% | 0.03% |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 34 presents marginal annual default rates (Moody's) by use-of-proceeds, by principal industry sector and by region.

Exhibit 34

**Marginal annual default rates (Moody's) by use-of-proceeds and industry**

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| EEA | 0.41% | 0.41% | 0.37% | 0.30% | 0.22% | 0.18% | 0.09% | 0.06% | 0.03% | 0.02% |
| Green infrastructure | 0.43% | 0.40% | 0.42% | 0.38% | 0.24% | 0.20% | 0.15% | 0.15% | 0.05% | 0.05% |
| Non-green infrastructure | 0.67% | 0.69% | 0.66% | 0.56% | 0.42% | 0.34% | 0.22% | 0.16% | 0.10% | 0.06% |
| Green power | 0.33% | 0.34% | 0.32% | 0.29% | 0.23% | 0.20% | 0.07% | 0.00% | 0.00% | 0.00% |
| Non-green power | 1.48% | 1.53% | 1.32% | 1.07% | 0.86% | 0.61% | 0.11% | 0.11% | 0.00% | 0.00% |
| Green oil and gas | 3.13% | 3.33% | 3.57% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Non-green oil and gas | 0.62% | 0.53% | 0.43% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Social | 0.10% | 0.08% | 0.06% | 0.04% | 0.03% | 0.03% | 0.03% | 0.03% | 0.01% | 0.00% |
| EEA/OECD | 0.63% | 0.61% | 0.51% | 0.39% | 0.31% | 0.23% | 0.13% | 0.09% | 0.05% | 0.02% |
| Green infrastructure | 0.68% | 0.60% | 0.55% | 0.45% | 0.35% | 0.24% | 0.20% | 0.20% | 0.08% | 0.08% |
| Non-green infrastructure | 0.73% | 0.75% | 0.74% | 0.63% | 0.48% | 0.39% | 0.25% | 0.18% | 0.08% | 0.05% |
| Green power | 0.40% | 0.41% | 0.40% | 0.31% | 0.23% | 0.20% | 0.09% | 0.02% | 0.02% | 0.01% |
| Non-green power | 1.26% | 1.24% | 0.97% | 0.77% | 0.66% | 0.42% | 0.24% | 0.18% | 0.12% | 0.02% |
| Green oil and gas | 11.42% | 12.21% | 9.83% | 4.57% | 3.75% | 2.70% | 2.82% | 1.45% | 1.47% | 1.49% |
| Non-green oil and gas | 0.88% | 0.76% | 0.59% | 0.38% | 0.33% | 0.21% | 0.07% | 0.00% | 0.00% | 0.00% |
| Social | 0.10% | 0.09% | 0.05% | 0.04% | 0.03% | 0.03% | 0.03% | 0.03% | 0.01% | 0.00% |
| EMDE-A | 1.26% | 1.23% | 0.99% | 0.69% | 0.43% | 0.32% | 0.17% | 0.16% | 0.06% | 0.06% |
| Green infrastructure | 2.52% | 2.35% | 1.77% | 0.74% | 0.77% | 0.40% | 0.41% | 0.42% | 0.00% | 0.00% |
| Non-green infrastructure | 0.75% | 0.80% | 0.72% | 0.63% | 0.39% | 0.41% | 0.28% | 0.14% | 0.15% | 0.15% |
| Green power | 1.01% | 1.04% | 0.99% | 0.85% | 0.35% | 0.26% | 0.00% | 0.00% | 0.00% | 0.00% |
| Non-green power | 1.55% | 1.45% | 1.04% | 0.49% | 0.45% | 0.27% | 0.07% | 0.07% | 0.00% | 0.00% |
| Green oil and gas | 4.50% | 2.38% | 2.50% | 2.63% | 2.70% | 2.78% | 2.86% | 2.94% | 0.00% | 0.00% |
| Non-green oil and gas | 1.06% | 1.09% | 0.89% | 0.70% | 0.44% | 0.33% | 0.28% | 0.28% | 0.15% | 0.15% |
| Social | 1.63% | 1.70% | 0.88% | 0.91% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| EMDE-B | 1.46% | 1.41% | 1.11% | 0.74% | 0.50% | 0.36% | 0.21% | 0.19% | 0.08% | 0.09% |
| Green infrastructure | 2.88% | 2.47% | 1.98% | 1.40% | 1.48% | 0.79% | 0.82% | 0.85% | 0.00% | 0.00% |
| Non-green infrastructure | 1.19% | 1.25% | 1.09% | 0.91% | 0.71% | 0.73% | 0.50% | 0.26% | 0.26% | 0.27% |
| Green power | 0.79% | 0.81% | 0.72% | 0.49% | 0.25% | 0.13% | 0.00% | 0.00% | 0.00% | 0.00% |
| Non-green power | 2.01% | 1.87% | 1.28% | 0.51% | 0.44% | 0.28% | 0.00% | 0.00% | 0.00% | 0.00% |
| Green oil and gas | 8.52% | 4.76% | 5.26% | 5.88% | 6.25% | 6.67% | 7.14% | 7.69% | 0.00% | 0.00% |
| Non-green oil and gas | 1.13% | 1.16% | 1.00% | 0.79% | 0.49% | 0.37% | 0.31% | 0.32% | 0.16% | 0.17% |
| Social | 3.23% | 3.39% | 1.79% | 1.85% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| Total regional subsets | 0.73% | 0.70% | 0.58% | 0.43% | 0.33% | 0.24% | 0.14% | 0.10% | 0.05% | 0.03% |
| Green infrastructure | 0.81% | 0.71% | 0.63% | 0.50% | 0.41% | 0.26% | 0.23% | 0.23% | 0.08% | 0.08% |
| Non-green infrastructure | 0.77% | 0.79% | 0.77% | 0.65% | 0.50% | 0.42% | 0.27% | 0.19% | 0.09% | 0.07% |
| Green power | 0.43% | 0.45% | 0.42% | 0.33% | 0.23% | 0.20% | 0.08% | 0.02% | 0.02% | 0.01% |
| Non-green power | 1.39% | 1.35% | 1.02% | 0.72% | 0.62% | 0.39% | 0.20% | 0.15% | 0.10% | 0.02% |
| Green oil and gas | 11.02% | 11.13% | 9.10% | 4.78% | 4.17% | 3.37% | 3.53% | 2.44% | 1.25% | 1.27% |
| Non-green oil and gas | 1.00% | 0.95% | 0.79% | 0.58% | 0.41% | 0.29% | 0.19% | 0.15% | 0.08% | 0.08% |
| Social | 0.12% | 0.11% | 0.06% | 0.05% | 0.03% | 0.03% | 0.03% | 0.03% | 0.01% | 0.00% |
| Total data sample | 0.70% | 0.67% | 0.56% | 0.41% | 0.32% | 0.23% | 0.14% | 0.10% | 0.05% | 0.03% |
| Green infrastructure | 0.81% | 0.71% | 0.64% | 0.52% | 0.39% | 0.25% | 0.22% | 0.23% | 0.08% | 0.08% |
| Non-green infrastructure | 0.75% | 0.77% | 0.75% | 0.64% | 0.49% | 0.41% | 0.27% | 0.18% | 0.09% | 0.07% |
| Green power | 0.43% | 0.44% | 0.42% | 0.32% | 0.23% | 0.20% | 0.08% | 0.02% | 0.02% | 0.01% |
| Non-green power | 1.27% | 1.23% | 0.93% | 0.65% | 0.56% | 0.35% | 0.18% | 0.13% | 0.08% | 0.02% |
| Green oil and gas | 10.62% | 10.70% | 8.75% | 4.60% | 4.04% | 3.30% | 3.49% | 2.44% | 1.25% | 1.27% |
| Non-green oil and gas | 0.87% | 0.82% | 0.68% | 0.50% | 0.35% | 0.25% | 0.16% | 0.13% | 0.07% | 0.07% |
| Social | 0.12% | 0.11% | 0.06% | 0.05% | 0.02% | 0.03% | 0.03% | 0.03% | 0.01% | 0.00% |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

## Cumulative annual default rates

We present first the findings for the total data sample by region, second by region and by use-of-proceeds and third by region, use-of-proceeds and industry.

**Cumulative annual default rates for the total data sample by region**

Exhibit 35 shows CDRs (Basel) by regional subsets. The average 10-year CDR for the total data sample is 5.0% (Basel) and 3.2% (Moody's). This is slightly lower than the 10-year CDR for the total study data set of 5.5% (Basel) and 3.7% (Moody's) published in March 2020. The March 2020 study also includes industry sectors with historically higher default risk, such as media and telecom, metals and mining, or manufacturing.

10-year CDRs are also slightly lower across all regional subsets than reported in the March 2020 study. Average 10-year CDRs (Basel) are highest in EMDE-B countries (6.8%), followed by EMDE-A countries (6.7%) and EEA/OECD countries (5.0%). Projects located in EEA countries have the lowest 10-year CDR, at 4.5%. We make similar observations based on Moody's definition of default shown in Exhibits 37 and 38.

Annual marginal default rates tend to decline over time and the differences in annual marginal default rates across subsets reduce as time passes from cohort formation. Project jurisdiction tends to be a less critical driver of default risk once a project has an initial operating track record.

While not directly comparable, we have included certain CDR data taken from our published research on default and recovery rates for corporate bond, loan and deposit issuers.[2]

It is apparent that 10-year CDRs (Basel) in the EEA and EEA/OECD subsets are consistent with 10-year CDR rates for corporate issuers of low investment-grade credit quality. In EMDEs the 10-year CDR falls in between those of Baa3- and Ba1-rated corporates. By comparison, corresponding CDRs for Baa3-rated and Ba1-rated corporates are 5.1% and 9.5%, respectively.

Exhibit 35

**Summary of cumulative default rates (Basel) for the total data sample by regional subsets**

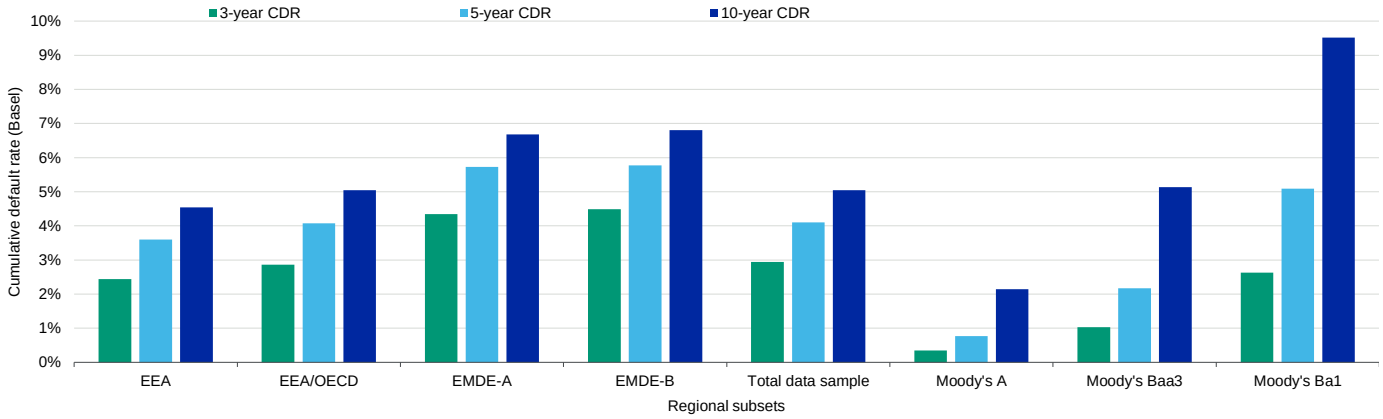
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| EEA | 0.86% | 1.68% | 2.44% | 3.10% | 3.60% | 3.97% | 4.18% | 4.36% | 4.47% | 4.54% |
| EEA/OECD | 1.05% | 2.03% | 2.87% | 3.54% | 4.07% | 4.46% | 4.69% | 4.86% | 4.98% | 5.04% |
| EMDE-A | 1.66% | 3.19% | 4.35% | 5.18% | 5.73% | 6.15% | 6.36% | 6.52% | 6.60% | 6.68% |
| EMDE-B | 1.75% | 3.35% | 4.49% | 5.26% | 5.77% | 6.17% | 6.40% | 6.59% | 6.70% | 6.81% |
| Total regional subsets | 1.13% | 2.19% | 3.06% | 3.75% | 4.28% | 4.66% | 4.90% | 5.07% | 5.19% | 5.26% |
| Total data sample | 1.08% | 2.10% | 2.94% | 3.60% | 4.10% | 4.47% | 4.70% | 4.87% | 4.97% | 5.04% |
| | | | | | | | | | | |
| Africa | 0.83% | 1.63% | 2.16% | 2.71% | 3.19% | 3.68% | 4.02% | 4.27% | 4.53% | 4.80% |
| Asia | 0.86% | 1.69% | 2.38% | 2.72% | 2.99% | 3.19% | 3.28% | 3.36% | 3.36% | 3.36% |
| Eastern Europe | 2.25% | 4.65% | 7.21% | 9.55% | 11.23% | 12.56% | 12.79% | 13.02% | 13.02% | 13.02% |
| Latin America | 2.75% | 5.16% | 6.70% | 7.72% | 8.15% | 8.41% | 8.54% | 8.68% | 8.75% | 8.82% |
| Middle East | 0.06% | 0.12% | 0.19% | 0.25% | 0.32% | 0.39% | 0.46% | 0.46% | 0.46% | 0.46% |
| North America | 1.55% | 2.98% | 4.05% | 4.84% | 5.48% | 5.95% | 6.27% | 6.47% | 6.61% | 6.67% |
| Oceania | 1.13% | 2.17% | 3.16% | 4.08% | 4.89% | 5.38% | 5.68% | 5.89% | 6.00% | 6.00% |
| Western Europe | 0.82% | 1.60% | 2.31% | 2.93% | 3.39% | 3.74% | 3.95% | 4.13% | 4.24% | 4.31% |
| Total data sample | 1.08% | 2.10% | 2.94% | 3.60% | 4.10% | 4.47% | 4.70% | 4.87% | 4.97% | 5.04% |
| | | | | | | | | | | |
| Moody's A | 0.06% | 0.17% | 0.35% | 0.54% | 0.77% | 1.03% | 1.30% | 1.58% | 1.87% | 2.14% |
| Moody's Baa | 0.17% | 0.44% | 0.75% | 1.12% | 1.50% | 1.90% | 2.27% | 2.64% | 3.02% | 3.42% |
| Moody's Baa3 | 0.24% | 0.60% | 1.03% | 1.55% | 2.17% | 2.81% | 3.37% | 3.98% | 4.57% | 5.13% |
| Moody's Ba1 | 0.43% | 1.42% | 2.63% | 3.83% | 5.09% | 6.26% | 7.17% | 7.91% | 8.66% | 9.52% |
| Moody's Ba2 | 0.74% | 1.92% | 3.30% | 4.69% | 5.97% | 7.00% | 8.01% | 9.16% | 10.47% | 11.84% |
| Moody's Ba3 | 1.36% | 3.82% | 6.78% | 10.05% | 12.74% | 15.25% | 17.60% | 19.80% | 21.79% | 23.69% |

Comparative cumulative default rate data for corporates is reproduced from Moody's Sector In-Depth report, "Annual default study: Defaults will rise modestly in 2019 amid higher volatility" February 2019, Exhibit 43 and Exhibit 44 for the period 1983-2018. It is based on the Moody's definition of default.
*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 36 shows CDRs (Basel) by regional subsets for year 3, 5 and 10.

Exhibit 36

**Selected cumulative default rates (Basel) by regional subsets**




Comparative cumulative default rate data for corporates is reproduced from Moody's Sector In-Depth report, "Annual default study: Defaults will rise modestly in 2019 amid higher volatility" February 2019, Exhibit 43 and Exhibit 44 for the period 1983-2018. It is based on the Moody's definition of default.
*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 37 shows CDRs (Moody's) by regional subsets. Average CDRs (Moody's) are below those based on the Basel definition of default across regions. 10-year CDRs (Moody's) in EEA are consistent with the default experience of A-rated corporates over the same

time horizon. For EMDEs, the 10-year CDR is slightly higher than observed for Baa3-rated corporates by Moody's over a 10-year time horizon.

Exhibit 37

**Summary of cumulative default rates (Moody's) for the total data sample by regional subsets**

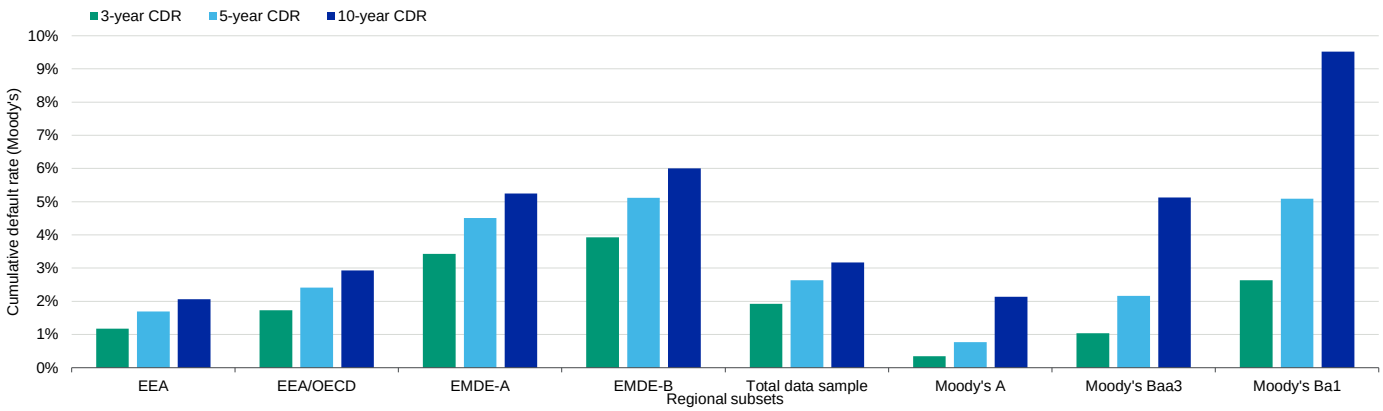
| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| EEA | 0.41% | 0.81% | 1.18% | 1.47% | 1.69% | 1.87% | 1.96% | 2.02% | 2.05% | 2.06% |
| EEA/OECD | 0.63% | 1.23% | 1.73% | 2.12% | 2.42% | 2.64% | 2.77% | 2.86% | 2.90% | 2.93% |
| EMDE-A | 1.26% | 2.47% | 3.43% | 4.10% | 4.51% | 4.82% | 4.98% | 5.13% | 5.19% | 5.25% |
| EMDE-B | 1.46% | 2.85% | 3.93% | 4.64% | 5.12% | 5.46% | 5.66% | 5.84% | 5.92% | 6.00% |
| Total regional subsets | 0.73% | 1.43% | 2.00% | 2.42% | 2.74% | 2.98% | 3.12% | 3.22% | 3.27% | 3.30% |
| Total data sample | 0.70% | 1.37% | 1.92% | 2.33% | 2.64% | 2.86% | 3.00% | 3.09% | 3.14% | 3.17% |
| | | | | | | | | | | |
| Africa | 0.69% | 1.41% | 1.93% | 2.31% | 2.70% | 3.03% | 3.28% | 3.45% | 3.62% | 3.79% |
| Asia | 0.76% | 1.52% | 2.17% | 2.51% | 2.78% | 2.98% | 3.06% | 3.14% | 3.14% | 3.14% |
| Eastern Europe | 1.10% | 2.27% | 3.51% | 4.84% | 5.64% | 6.28% | 6.50% | 6.72% | 6.72% | 6.72% |
| Latin America | 2.24% | 4.27% | 5.78% | 6.83% | 7.31% | 7.62% | 7.82% | 8.01% | 8.08% | 8.15% |
| Middle East | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% | 0.00% |
| North America | 1.12% | 2.17% | 2.98% | 3.56% | 4.05% | 4.39% | 4.64% | 4.79% | 4.89% | 4.94% |
| Oceania | 0.92% | 1.81% | 2.63% | 3.45% | 4.16% | 4.55% | 4.75% | 4.96% | 5.06% | 5.06% |
| Western Europe | 0.40% | 0.78% | 1.13% | 1.40% | 1.60% | 1.77% | 1.86% | 1.91% | 1.94% | 1.96% |
| Total data sample | 0.70% | 1.37% | 1.92% | 2.33% | 2.64% | 2.86% | 3.00% | 3.09% | 3.14% | 3.17% |
| | | | | | | | | | | |
| Moody's A | 0.06% | 0.17% | 0.35% | 0.54% | 0.77% | 1.03% | 1.30% | 1.58% | 1.87% | 2.14% |
| Moody's Baa | 0.17% | 0.44% | 0.75% | 1.12% | 1.50% | 1.90% | 2.27% | 2.64% | 3.02% | 3.42% |
| Moody's Baa3 | 0.24% | 0.60% | 1.03% | 1.55% | 2.17% | 2.81% | 3.37% | 3.98% | 4.57% | 5.13% |
| Moody's Ba1 | 0.43% | 1.42% | 2.63% | 3.83% | 5.09% | 6.26% | 7.17% | 7.91% | 8.66% | 9.52% |
| Moody's Ba2 | 0.74% | 1.92% | 3.30% | 4.69% | 5.97% | 7.00% | 8.01% | 9.16% | 10.47% | 11.84% |
| Moody's Ba3 | 1.36% | 3.82% | 6.78% | 10.05% | 12.74% | 15.25% | 17.60% | 19.80% | 21.79% | 23.69% |

Comparative cumulative default rate data for corporates is reproduced from Moody's Sector In-Depth report, "Annual default study: Defaults will rise modestly in 2019 amid higher volatility" February 2019, Exhibit 43 and Exhibit 44 for the period 1983-2018.
*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 38 shows CDRs (Moody's) by regional subsets for year 3, 5 and 10.

Exhibit 38

**Selected cumulative default rates (Moody's) by regional subsets**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

**Cumulative annual default rates for the total data sample by region and use-of-proceeds**

Exhibit 39 tabulates cumulative default rates (Basel) by use-of-proceeds.

Exhibit 39

**Cumulative annual default rates (Basel) by use-of-proceeds**

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| EEA | 0.86% | 1.68% | 2.44% | 3.10% | 3.60% | 3.97% | 4.18% | 4.36% | 4.47% | 4.54% |
| Green use-of-proceeds | 0.85% | 1.68% | 2.48% | 3.20% | 3.74% | 4.16% | 4.36% | 4.46% | 4.50% | 4.54% |
| Non-green use-of-proceeds | 1.63% | 3.23% | 4.70% | 5.93% | 6.89% | 7.61% | 8.04% | 8.48% | 8.81% | 9.01% |
| Social | 0.22% | 0.42% | 0.59% | 0.72% | 0.82% | 0.89% | 0.97% | 1.04% | 1.08% | 1.11% |
| Other | 1.50% | 3.12% | 4.85% | 6.71% | 8.72% | 9.45% | 10.21% | 10.99% | 10.99% | 10.99% |
| | | | | | | | | | | |
| EEA/OECD | 1.05% | 2.03% | 2.87% | 3.54% | 4.07% | 4.46% | 4.69% | 4.86% | 4.98% | 5.04% |
| Green use-of-proceeds | 1.01% | 1.97% | 2.82% | 3.52% | 4.05% | 4.46% | 4.68% | 4.82% | 4.89% | 4.95% |
| Non-green use-of-proceeds | 1.60% | 3.13% | 4.40% | 5.44% | 6.27% | 6.87% | 7.25% | 7.55% | 7.76% | 7.87% |
| Social | 0.20% | 0.39% | 0.54% | 0.65% | 0.74% | 0.80% | 0.87% | 0.93% | 0.97% | 1.00% |
| Other | 1.54% | 3.18% | 4.93% | 6.32% | 7.79% | 8.32% | 8.86% | 9.41% | 9.41% | 9.41% |
| | | | | | | | | | | |
| EMDE-A | 1.66% | 3.19% | 4.35% | 5.18% | 5.73% | 6.15% | 6.36% | 6.52% | 6.60% | 6.68% |
| Green use-of-proceeds | 2.10% | 3.89% | 5.32% | 6.39% | 7.07% | 7.55% | 7.62% | 7.69% | 7.69% | 7.69% |
| Non-green use-of-proceeds | 1.52% | 2.95% | 4.02% | 4.75% | 5.28% | 5.70% | 5.97% | 6.17% | 6.28% | 6.40% |
| Social | 1.63% | 3.31% | 4.16% | 5.03% | 5.03% | 5.03% | 5.03% | 5.03% | 5.03% | 5.03% |
| Other | 1.49% | 3.06% | 4.67% | 6.34% | 6.34% | 6.34% | 6.34% | 6.34% | 6.34% | 6.34% |
| | | | | | | | | | | |
| EMDE-B | 1.75% | 3.35% | 4.49% | 5.26% | 5.77% | 6.17% | 6.40% | 6.59% | 6.70% | 6.81% |
| Green use-of-proceeds | 1.49% | 2.73% | 3.52% | 4.12% | 4.53% | 4.74% | 4.84% | 4.95% | 4.95% | 4.95% |
| Non-green use-of-proceeds | 1.79% | 3.46% | 4.68% | 5.46% | 6.02% | 6.50% | 6.78% | 7.00% | 7.15% | 7.31% |
| Social | 3.23% | 6.51% | 8.18% | 9.88% | 9.88% | 9.88% | 9.88% | 9.88% | 9.88% | 9.88% |
| Other | 2.38% | 4.82% | 7.33% | 9.90% | 9.90% | 9.90% | 9.90% | 9.90% | 9.90% | 9.90% |
| | | | | | | | | | | |
| Total regional subsets | 1.13% | 2.19% | 3.06% | 3.75% | 4.28% | 4.66% | 4.90% | 5.07% | 5.19% | 5.26% |
| Green use-of-proceeds | 1.05% | 2.03% | 2.87% | 3.56% | 4.08% | 4.48% | 4.69% | 4.83% | 4.90% | 4.95% |
| Non-green use-of-proceeds | 1.64% | 3.20% | 4.46% | 5.45% | 6.22% | 6.79% | 7.15% | 7.43% | 7.63% | 7.75% |
| Social | 0.23% | 0.43% | 0.59% | 0.72% | 0.80% | 0.87% | 0.93% | 1.00% | 1.03% | 1.06% |
| Other | 1.65% | 3.41% | 5.27% | 6.84% | 8.08% | 8.52% | 8.97% | 9.43% | 9.43% | 9.43% |
| | | | | | | | | | | |
| Total data sample | 1.08% | 2.10% | 2.94% | 3.60% | 4.10% | 4.47% | 4.70% | 4.87% | 4.97% | 5.04% |
| Green use-of-proceeds | 1.04% | 2.01% | 2.85% | 3.54% | 4.05% | 4.44% | 4.65% | 4.78% | 4.85% | 4.91% |
| Non-green use-of-proceeds | 1.50% | 2.94% | 4.09% | 4.99% | 5.70% | 6.22% | 6.55% | 6.81% | 6.99% | 7.10% |
| Social | 0.23% | 0.43% | 0.59% | 0.71% | 0.80% | 0.86% | 0.93% | 0.99% | 1.03% | 1.05% |
| Other | 1.52% | 3.13% | 4.84% | 6.29% | 7.44% | 7.85% | 8.27% | 8.69% | 8.69% | 8.69% |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 40 shows CDRs (Basel) for the total data sample by use-of-proceeds:

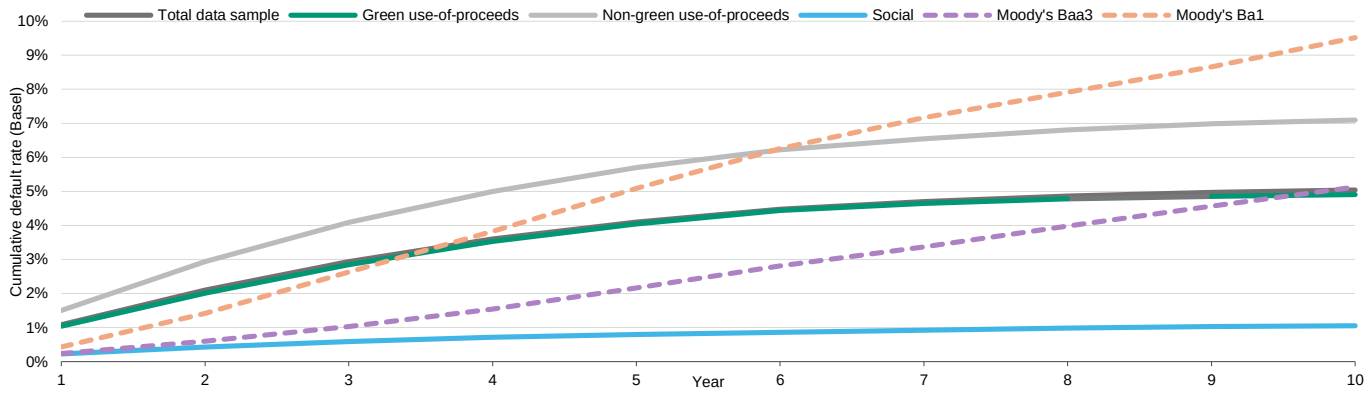
» Green projects have a 10-year CDR of 4.9%, closely aligned with the 5.0% 10-year CDR of the total data sample.

» Non-green projects have a 10-year CDR of 7.1%, above the default experience of green and social use-of-proceeds projects.

» Social projects have the lowest 10-year CDR of 1.1%, which benefits in particular from the low default risk of these projects in the EEA/OECD subset.

Exhibit 40

**Cumulative default rates (Basel) for total data sample by use-of-proceeds**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

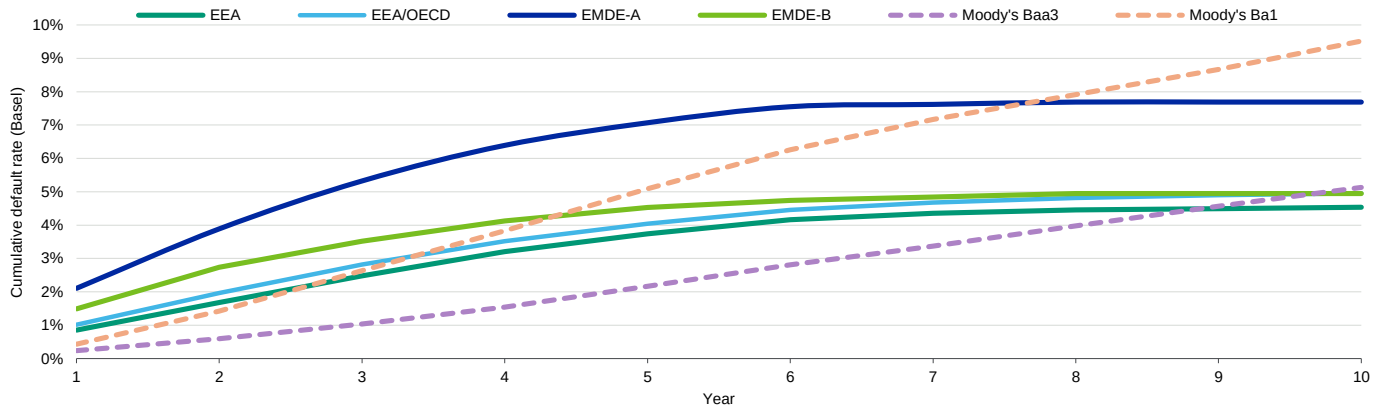
Exhibit 41 shows CDRs (Basel) for green use-of-proceeds projects by regional subsets:

» Green projects have a similar default experience in the EEA (10-year CDR 4.5%), EEA/OECD (4.95%) and EMDE-B (4.95%) subsets.

» Green projects have a substantially higher 10-year CDRs in the EMDE-A subset (7.7%) as result of 18 defaults in Poland, Chile, Romania, Mexico. These countries are not included in the EMDE-B subset.

Exhibit 41

**Cumulative default rates (Basel) for green use-of-proceeds projects by regional subsets**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

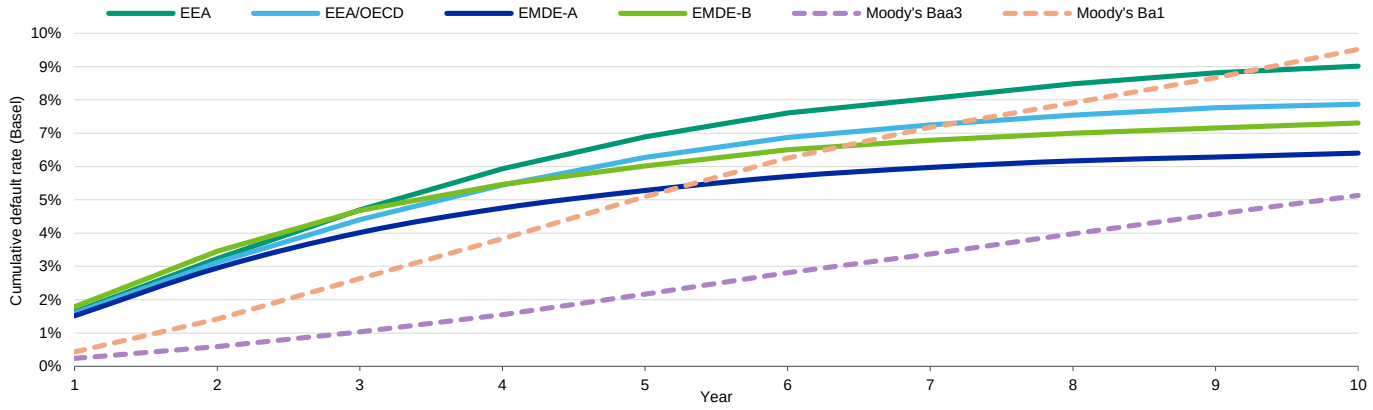
Exhibit 42 shows CDRs (Basel) for non-green use-of-proceeds projects by regional subsets:

» 10-year CDRs for non-green projects vary less by region than CDRs for green and social projects.

» 10-year CDR across regional subsets fall within a narrow range: EEA (9.0%), EEA/OECD (7.9%), EMDE-A (6.4%), EMDE-B (7.3%).

Exhibit 42

**Cumulative default rates (Basel) for non-green use-of-proceeds projects by regional subsets**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

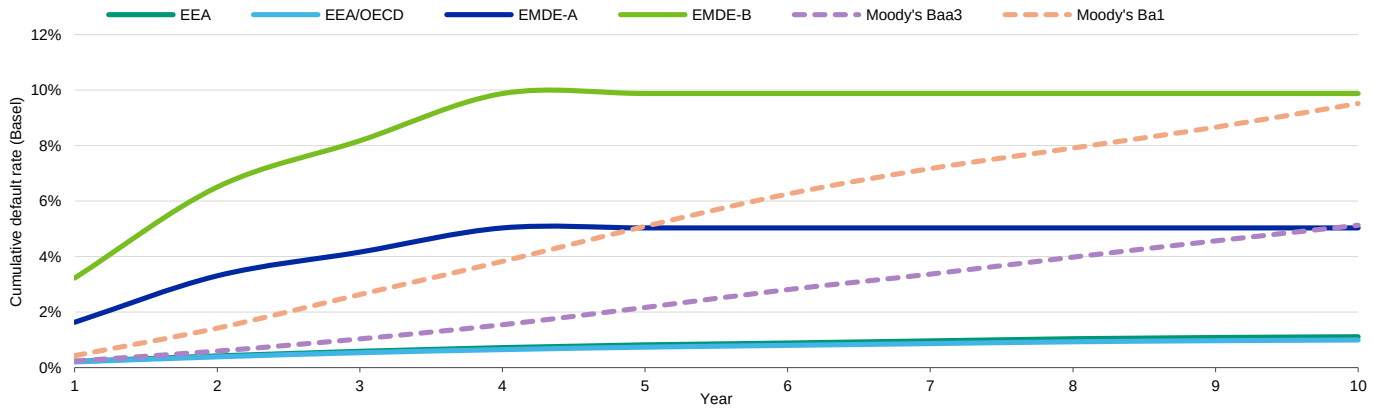
Exhibit 43 shows CDRs (Basel) for social projects by regional subsets:

» Social projects included in the data sample are availability-based projects. They have the lowest 10-year CDR in EEA and EEA/OECD of 1.0%-1.1%%. This drives the low 10-year CDR of 1.1% for these projects for the total data sample.

» Social projects have higher 10-year CDRs in EMDE-A (5.0%) and EMDE-B (9.9%). However, social projects are less prevalent in the EMDE subsets. The data sample only includes 32 social projects in EMDE-A and 14 in EMDE-B, of which 2 have defaulted.

Exhibit 43

**Cumulative default rates (Basel) for social use-of-proceeds projects by regional subsets**




*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 44 tabulates cumulative default rates (Moody's) by use-of-proceeds.

Exhibit 44

**Cumulative annual default rates (Moody's) by use-of-proceeds**

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| EEA | 0.41% | 0.81% | 1.18% | 1.47% | 1.69% | 1.87% | 1.96% | 2.02% | 2.05% | 2.06% |
| Green use-of-proceeds | 0.37% | 0.74% | 1.09% | 1.40% | 1.63% | 1.83% | 1.91% | 1.95% | 1.96% | 1.98% |
| Non-green use-of-proceeds | 0.85% | 1.71% | 2.48% | 3.06% | 3.51% | 3.85% | 4.02% | 4.14% | 4.21% | 4.25% |
| Social | 0.10% | 0.18% | 0.24% | 0.28% | 0.31% | 0.34% | 0.37% | 0.40% | 0.41% | 0.41% |
| Other | 0.47% | 0.93% | 1.40% | 1.86% | 2.33% | 2.79% | 3.26% | 3.72% | 4.19% | 4.19% |
| | | | | | | | | | | |
| EEA/OECD | 0.63% | 1.23% | 1.73% | 2.12% | 2.42% | 2.64% | 2.77% | 2.86% | 2.90% | 2.93% |
| Green use-of-proceeds | 0.58% | 1.14% | 1.64% | 2.01% | 2.28% | 2.51% | 2.63% | 2.70% | 2.74% | 2.77% |
| Non-green use-of-proceeds | 1.01% | 1.99% | 2.80% | 3.44% | 3.96% | 4.33% | 4.54% | 4.69% | 4.77% | 4.80% |
| Social | 0.10% | 0.18% | 0.23% | 0.27% | 0.29% | 0.32% | 0.34% | 0.37% | 0.38% | 0.38% |
| Other | 0.37% | 0.77% | 1.19% | 1.63% | 2.09% | 2.57% | 3.06% | 3.55% | 3.55% | 3.55% |
| | | | | | | | | | | |
| EMDE-A | 1.26% | 2.47% | 3.43% | 4.10% | 4.51% | 4.82% | 4.98% | 5.13% | 5.19% | 5.25% |
| Green use-of-proceeds | 1.39% | 2.69% | 3.84% | 4.68% | 5.14% | 5.48% | 5.61% | 5.75% | 5.75% | 5.75% |
| Non-green use-of-proceeds | 1.20% | 2.36% | 3.25% | 3.84% | 4.25% | 4.56% | 4.75% | 4.91% | 5.00% | 5.08% |
| Social | 1.63% | 3.31% | 4.16% | 5.03% | 5.03% | 5.03% | 5.03% | 5.03% | 5.03% | 5.03% |
| Other | 1.49% | 3.06% | 4.67% | 6.34% | 6.34% | 6.34% | 6.34% | 6.34% | 6.34% | 6.34% |
| | | | | | | | | | | |
| EMDE-B | 1.46% | 2.85% | 3.93% | 4.64% | 5.12% | 5.46% | 5.66% | 5.84% | 5.92% | 6.00% |
| Green use-of-proceeds | 1.28% | 2.41% | 3.38% | 4.07% | 4.57% | 4.88% | 5.08% | 5.29% | 5.29% | 5.29% |
| Non-green use-of-proceeds | 1.47% | 2.90% | 3.98% | 4.66% | 5.14% | 5.51% | 5.71% | 5.89% | 6.00% | 6.11% |
| Social | 3.23% | 6.51% | 8.18% | 9.88% | 9.88% | 9.88% | 9.88% | 9.88% | 9.88% | 9.88% |
| Other | 2.38% | 4.82% | 7.33% | 9.90% | 9.90% | 9.90% | 9.90% | 9.90% | 9.90% | 9.90% |
| | | | | | | | | | | |
| Total regional subsets | 0.73% | 1.43% | 2.00% | 2.42% | 2.74% | 2.98% | 3.12% | 3.22% | 3.27% | 3.30% |
| Green use-of-proceeds | 0.64% | 1.24% | 1.77% | 2.16% | 2.46% | 2.68% | 2.81% | 2.89% | 2.93% | 2.96% |
| Non-green use-of-proceeds | 1.11% | 2.19% | 3.06% | 3.71% | 4.22% | 4.59% | 4.80% | 4.95% | 5.04% | 5.09% |
| Social | 0.12% | 0.23% | 0.29% | 0.34% | 0.36% | 0.39% | 0.41% | 0.44% | 0.45% | 0.45% |
| Other | 0.63% | 1.30% | 2.01% | 2.75% | 3.14% | 3.55% | 3.96% | 4.38% | 4.38% | 4.38% |
| | | | | | | | | | | |
| Total data sample | 0.70% | 1.37% | 1.92% | 2.33% | 2.64% | 2.86% | 3.00% | 3.09% | 3.14% | 3.17% |
| Green use-of-proceeds | 0.63% | 1.23% | 1.77% | 2.16% | 2.45% | 2.67% | 2.80% | 2.88% | 2.92% | 2.95% |
| Non-green use-of-proceeds | 1.02% | 2.01% | 2.81% | 3.40% | 3.88% | 4.21% | 4.41% | 4.55% | 4.63% | 4.67% |
| Social | 0.12% | 0.23% | 0.29% | 0.34% | 0.36% | 0.39% | 0.41% | 0.44% | 0.45% | 0.45% |
| Other | 0.58% | 1.20% | 1.85% | 2.54% | 2.91% | 3.29% | 3.67% | 4.06% | 4.06% | 4.06% |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

**Cumulative annual default rates for the total data sample by region, use-of-proceeds and industry**

Exhibit 45 tabulates cumulative default rates (Basel) by region, use-of-proceeds and industry.

The more detailed analysis of projects by use-of-proceeds and industry allows for a better understanding of the differences in default risks by industry sector. However, the limited number of observations in certain subsets constrains robust conclusions.

Key observations include:

**Infrastructure:**

» The average 10-year CDR (Basel) for the infrastructure industry sector was 4.2% in the March 2020 study.

- **Green infrastructure:** The 10-year CDR for green infrastructure projects is 4.9%, below the 10-year CDR for non-green infrastructure projects of 8.6%. There is a marked difference in the performance of green infrastructure projects in advanced economies versus in the EMDE subsets. In advanced economies the 10-year CDR ranges from 3.6%-4.6%, benefiting from the low default risk of environmental projects. In EMDEs, the 10-year CDR ranges from 9.0%-12.0% and is high for environmental projects.
- **Non-green infrastructure**: The 10-year CDR for non-green infrastructure projects is 8.6%. Non-green infrastructure projects mostly consist of transportation projects and experienced higher 10-year CDRs in advanced economies than in EMDEs. Transportation projects in Western Europe experienced a higher count of defaults following the financial crisis. Exhibit 47 also highlights that regional differences in CDRs for non-green infrastructure projects are less prevalent based on the Moody's definition of default. The transportation segment includes many defaults that are only a default under the Basel definition. This means that the bank has taken a write-off but a payment default has not occurred yet.
- **Social:** All social projects are included in the infrastructure industry sector and have a 10-year CDR (Basel) of 1.1%. Please see previous comments for exhibit 44.

**Power:**

- The average 10-year CDR (Basel) for the power industry sector was 5.6% in the March 2020 study.
- Green power projects have a 10-year CDR of 4.5%, below the 10-year CDR of non-green power projects of 7.2%.
- Green power projects have consistently lower default risk than non-green power projects across most regional subsets. Structural benefits of many renewable power projects, including subsidies, tax benefits and purchase power agreements likely support this finding.

**Green and non-green oil and gas:**

- The average 10-year CDR (Basel) for the oil and gas industry sector was 5.9% in the March 2020 study.
- The 10-year CDR for green oil and gas projects is 39.7%, compared with 4.8% for non-green oil and gas projects.
- The very high CDR for green oil and gas projects reflects the default experience of biofuels projects. Many biofuels projects have failed as a result of lower than expected market prices, technical difficulties and an inability to achieve the expected operating yields.

**Impact of causes of default on default and recovery experience :**

- In EEA and EEA/OECD countries, the most prevalent cause of default is market risk (EEA 31.8% and 37.5%), similar to our findings in the March 2020 study. The share of defaults for which country risk is the primary cause of default is less than 5%.
- In the EMDE subsets, country risk (EMDE-A 35.7%, EMDE-B 45.5%) is the most prevalent cause of default, followed by construction risk and market risk.
- None of the defaults of social projects or green power projects were caused by exposure to market risks. This reflects that all social projects in the data sample are availability-based projects and many green power projects benefit from purchase power agreements.

Exhibit 45

**Cumulative default rates (Basel) by use-of-proceeds and industry**

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| EEA | 0.86% | 1.68% | 2.44% | 3.10% | 3.60% | 3.97% | 4.18% | 4.36% | 4.47% | 4.54% |
| Green infrastructure | 0.66% | 1.30% | 1.90% | 2.52% | 2.96% | 3.26% | 3.47% | 3.62% | 3.62% | 3.62% |
| Non-green infrastructure | 1.65% | 3.27% | 4.82% | 6.17% | 7.20% | 7.93% | 8.42% | 8.91% | 9.27% | 9.54% |
| Green power | 0.89% | 1.76% | 2.60% | 3.36% | 3.92% | 4.40% | 4.59% | 4.67% | 4.72% | 4.78% |
| Non-green power | 2.09% | 4.18% | 6.00% | 7.59% | 8.90% | 9.98% | 10.50% | 11.04% | 11.49% | 11.61% |
| Green oil and gas | 7.56% | 15.43% | 23.49% | 23.49% | 23.49% | 23.49% | 23.49% | 23.49% | 23.49% | 23.49% |
| Non-green oil and gas | 0.74% | 1.40% | 1.83% | 1.83% | 1.83% | 1.83% | 1.83% | 1.83% | 1.83% | 1.83% |
| Social | 0.22% | 0.42% | 0.59% | 0.72% | 0.82% | 0.89% | 0.97% | 1.04% | 1.08% | 1.11% |
| EEA/OECD | 1.05% | 2.03% | 2.87% | 3.54% | 4.07% | 4.46% | 4.69% | 4.86% | 4.98% | 5.04% |
| Green infrastructure | 0.90% | 1.73% | 2.46% | 3.15% | 3.69% | 4.04% | 4.28% | 4.48% | 4.52% | 4.57% |
| Non-green infrastructure | 1.59% | 3.14% | 4.62% | 5.90% | 6.88% | 7.56% | 8.05% | 8.46% | 8.75% | 8.96% |
| Green power | 0.87% | 1.70% | 2.50% | 3.19% | 3.70% | 4.12% | 4.33% | 4.45% | 4.54% | 4.61% |
| Non-green power | 1.73% | 3.44% | 4.75% | 5.82% | 6.69% | 7.34% | 7.72% | 8.01% | 8.23% | 8.28% |
| Green oil and gas | 15.33% | 30.29% | 38.84% | 40.86% | 43.01% | 44.15% | 45.32% | 45.32% | 45.32% | 45.32% |
| Non-green oil and gas | 1.14% | 2.06% | 2.65% | 2.96% | 3.23% | 3.43% | 3.50% | 3.50% | 3.50% | 3.50% |
| Social | 0.20% | 0.39% | 0.54% | 0.65% | 0.74% | 0.80% | 0.87% | 0.93% | 0.97% | 1.00% |
| EMDE-A | 1.66% | 3.19% | 4.35% | 5.18% | 5.73% | 6.15% | 6.36% | 6.52% | 6.60% | 6.68% |
| Green infrastructure | 2.53% | 4.81% | 6.50% | 7.19% | 7.90% | 8.27% | 8.65% | 9.03% | 9.03% | 9.03% |
| Non-green infrastructure | 1.08% | 2.22% | 3.17% | 3.91% | 4.42% | 4.82% | 4.96% | 5.10% | 5.24% | 5.39% |
| Green power | 1.82% | 3.44% | 4.77% | 5.95% | 6.63% | 7.15% | 7.15% | 7.15% | 7.15% | 7.15% |
| Non-green power | 1.77% | 3.43% | 4.62% | 5.21% | 5.71% | 6.04% | 6.17% | 6.24% | 6.24% | 6.24% |
| Green oil and gas | 9.29% | 12.53% | 15.89% | 15.89% | 15.89% | 15.89% | 15.89% | 15.89% | 15.89% | 15.89% |
| Non-green oil and gas | 1.47% | 2.82% | 3.82% | 4.70% | 5.26% | 5.79% | 6.26% | 6.61% | 6.83% | 7.05% |
| Social | 1.63% | 3.31% | 4.16% | 5.03% | 5.03% | 5.03% | 5.03% | 5.03% | 5.03% | 5.03% |
| EMDE-B | 1.75% | 3.35% | 4.49% | 5.26% | 5.77% | 6.17% | 6.40% | 6.59% | 6.70% | 6.81% |
| Green infrastructure | 2.88% | 5.28% | 7.16% | 8.46% | 9.81% | 10.52% | 11.26% | 12.01% | 12.01% | 12.01% |
| Non-green infrastructure | 1.60% | 3.27% | 4.56% | 5.45% | 6.13% | 6.84% | 7.08% | 7.32% | 7.57% | 7.82% |
| Green power | 1.02% | 2.06% | 2.66% | 3.14% | 3.38% | 3.50% | 3.50% | 3.50% | 3.50% | 3.50% |
| Non-green power | 2.17% | 4.16% | 5.48% | 5.96% | 6.39% | 6.65% | 6.65% | 6.65% | 6.65% | 6.65% |
| Green oil and gas | 12.16% | 12.16% | 12.16% | 12.16% | 12.16% | 12.16% | 12.16% | 12.16% | 12.16% | 12.16% |
| Non-green oil and gas | 1.54% | 2.95% | 4.08% | 5.07% | 5.70% | 6.29% | 6.82% | 7.21% | 7.45% | 7.69% |
| Social | 3.23% | 6.51% | 8.18% | 9.88% | 9.88% | 9.88% | 9.88% | 9.88% | 9.88% | 9.88% |
| Total regional subsets | 1.13% | 2.19% | 3.06% | 3.75% | 4.28% | 4.66% | 4.90% | 5.07% | 5.19% | 5.26% |
| Green infrastructure | 1.01% | 1.93% | 2.73% | 3.44% | 4.03% | 4.40% | 4.67% | 4.90% | 4.94% | 4.98% |
| Non-green infrastructure | 1.59% | 3.15% | 4.61% | 5.86% | 6.81% | 7.49% | 7.95% | 8.35% | 8.63% | 8.85% |
| Green power | 0.89% | 1.73% | 2.52% | 3.19% | 3.68% | 4.07% | 4.26% | 4.38% | 4.46% | 4.52% |
| Non-green power | 1.81% | 3.56% | 4.88% | 5.84% | 6.63% | 7.21% | 7.52% | 7.75% | 7.93% | 7.97% |
| Green oil and gas | 14.95% | 28.10% | 35.60% | 37.38% | 39.25% | 40.23% | 41.22% | 41.22% | 41.22% | 41.22% |
| Non-green oil and gas | 1.33% | 2.49% | 3.34% | 3.98% | 4.42% | 4.81% | 5.11% | 5.30% | 5.41% | 5.53% |
| Social | 0.23% | 0.43% | 0.59% | 0.72% | 0.80% | 0.87% | 0.93% | 1.00% | 1.03% | 1.06% |
| Total data sample | 1.08% | 2.10% | 2.94% | 3.60% | 4.10% | 4.47% | 4.70% | 4.87% | 4.97% | 5.04% |
| Green infrastructure | 1.01% | 1.92% | 2.72% | 3.45% | 4.01% | 4.37% | 4.62% | 4.85% | 4.88% | 4.92% |
| Non-green infrastructure | 1.55% | 3.06% | 4.48% | 5.70% | 6.63% | 7.29% | 7.75% | 8.14% | 8.41% | 8.62% |
| Green power | 0.88% | 1.72% | 2.49% | 3.16% | 3.65% | 4.04% | 4.23% | 4.34% | 4.42% | 4.48% |
| Non-green power | 1.65% | 3.25% | 4.44% | 5.31% | 6.02% | 6.54% | 6.82% | 7.03% | 7.19% | 7.22% |
| Green oil and gas | 14.29% | 26.91% | 34.14% | 35.88% | 37.72% | 38.70% | 39.70% | 39.70% | 39.70% | 39.70% |
| Non-green oil and gas | 1.15% | 2.15% | 2.88% | 3.44% | 3.82% | 4.15% | 4.41% | 4.57% | 4.67% | 4.77% |
| Social | 0.23% | 0.43% | 0.59% | 0.71% | 0.80% | 0.86% | 0.93% | 0.99% | 1.03% | 1.05% |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 46 tabulates cumulative default rates (Moody's) by region, use-of-proceeds and industry.

Exhibit 46

**Cumulative default rates (Moody's) by use-of-proceeds and industry**

| Year | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
|---|---|---|---|---|---|---|---|---|---|---|
| EEA | 0.41% | 0.81% | 1.18% | 1.47% | 1.69% | 1.87% | 1.96% | 2.02% | 2.05% | 2.06% |
| Green infrastructure | 0.43% | 0.83% | 1.25% | 1.62% | 1.86% | 2.06% | 2.20% | 2.35% | 2.40% | 2.46% |
| Non-green infrastructure | 0.67% | 1.35% | 2.00% | 2.55% | 2.97% | 3.30% | 3.51% | 3.66% | 3.76% | 3.82% |
| Green power | 0.33% | 0.67% | 0.99% | 1.28% | 1.51% | 1.71% | 1.77% | 1.77% | 1.77% | 1.77% |
| Non-green power | 1.48% | 2.99% | 4.27% | 5.30% | 6.11% | 6.68% | 6.78% | 6.89% | 6.89% | 6.89% |
| Green oil and gas | 3.13% | 6.35% | 9.70% | 9.70% | 9.70% | 9.70% | 9.70% | 9.70% | 9.70% | 9.70% |
| Non-green oil and gas | 0.62% | 1.14% | 1.57% | 1.57% | 1.57% | 1.57% | 1.57% | 1.57% | 1.57% | 1.57% |
| Social | 0.10% | 0.18% | 0.24% | 0.28% | 0.31% | 0.34% | 0.37% | 0.40% | 0.41% | 0.41% |
| EEA/OECD | 0.63% | 1.23% | 1.73% | 2.12% | 2.42% | 2.64% | 2.77% | 2.86% | 2.90% | 2.93% |
| Green infrastructure | 0.68% | 1.28% | 1.83% | 2.27% | 2.62% | 2.85% | 3.04% | 3.24% | 3.32% | 3.40% |
| Non-green infrastructure | 0.73% | 1.47% | 2.20% | 2.81% | 3.28% | 3.66% | 3.90% | 4.07% | 4.14% | 4.19% |
| Green power | 0.40% | 0.81% | 1.21% | 1.51% | 1.74% | 1.94% | 2.03% | 2.05% | 2.07% | 2.08% |
| Non-green power | 1.26% | 2.49% | 3.43% | 4.17% | 4.80% | 5.20% | 5.43% | 5.60% | 5.71% | 5.73% |
| Green oil and gas | 11.42% | 22.24% | 29.89% | 33.09% | 35.60% | 37.34% | 39.11% | 39.99% | 40.87% | 41.75% |
| Non-green oil and gas | 0.88% | 1.63% | 2.21% | 2.58% | 2.90% | 3.11% | 3.18% | 3.18% | 3.18% | 3.18% |
| Social | 0.10% | 0.18% | 0.23% | 0.27% | 0.29% | 0.32% | 0.34% | 0.37% | 0.38% | 0.38% |
| EMDE-A | 1.26% | 2.47% | 3.43% | 4.10% | 4.51% | 4.82% | 4.98% | 5.13% | 5.19% | 5.25% |
| Green infrastructure | 2.52% | 4.81% | 6.50% | 7.19% | 7.90% | 8.26% | 8.64% | 9.03% | 9.03% | 9.03% |
| Non-green infrastructure | 0.75% | 1.54% | 2.25% | 2.86% | 3.24% | 3.64% | 3.91% | 4.05% | 4.19% | 4.33% |
| Green power | 1.01% | 2.04% | 3.02% | 3.84% | 4.18% | 4.43% | 4.43% | 4.43% | 4.43% | 4.43% |
| Non-green power | 1.55% | 2.98% | 3.99% | 4.46% | 4.89% | 5.15% | 5.21% | 5.28% | 5.28% | 5.28% |
| Green oil and gas | 4.50% | 6.77% | 9.10% | 11.49% | 13.88% | 16.28% | 18.67% | 21.06% | 21.06% | 21.06% |
| Non-green oil and gas | 1.06% | 2.13% | 3.00% | 3.68% | 4.10% | 4.42% | 4.68% | 4.95% | 5.09% | 5.23% |
| Social | 1.63% | 3.31% | 4.16% | 5.03% | 5.03% | 5.03% | 5.03% | 5.03% | 5.03% | 5.03% |
| EMDE-B | 1.46% | 2.85% | 3.93% | 4.64% | 5.12% | 5.46% | 5.66% | 5.84% | 5.92% | 6.00% |
| Green infrastructure | 2.88% | 5.28% | 7.16% | 8.46% | 9.81% | 10.52% | 11.26% | 12.01% | 12.01% | 12.01% |
| Non-green infrastructure | 1.19% | 2.43% | 3.49% | 4.37% | 5.04% | 5.74% | 6.21% | 6.46% | 6.70% | 6.95% |
| Green power | 0.79% | 1.59% | 2.29% | 2.77% | 3.01% | 3.14% | 3.14% | 3.14% | 3.14% | 3.14% |
| Non-green power | 2.01% | 3.84% | 5.08% | 5.56% | 5.98% | 6.24% | 6.24% | 6.24% | 6.24% | 6.24% |
| Green oil and gas | 8.52% | 12.88% | 17.46% | 22.32% | 27.17% | 32.03% | 36.88% | 41.74% | 41.74% | 41.74% |
| Non-green oil and gas | 1.13% | 2.28% | 3.26% | 4.03% | 4.50% | 4.85% | 5.15% | 5.45% | 5.61% | 5.77% |
| Social | 3.23% | 6.51% | 8.18% | 9.88% | 9.88% | 9.88% | 9.88% | 9.88% | 9.88% | 9.88% |
| Total regional subsets | 0.73% | 1.43% | 2.00% | 2.42% | 2.74% | 2.98% | 3.12% | 3.22% | 3.27% | 3.30% |
| Green infrastructure | 0.81% | 1.51% | 2.12% | 2.62% | 3.01% | 3.27% | 3.49% | 3.72% | 3.79% | 3.87% |
| Non-green infrastructure | 0.77% | 1.56% | 2.32% | 2.96% | 3.44% | 3.85% | 4.11% | 4.29% | 4.38% | 4.45% |
| Green power | 0.43% | 0.87% | 1.29% | 1.61% | 1.84% | 2.04% | 2.12% | 2.14% | 2.16% | 2.17% |
| Non-green power | 1.39% | 2.73% | 3.72% | 4.42% | 5.01% | 5.38% | 5.57% | 5.71% | 5.80% | 5.82% |
| Green oil and gas | 11.02% | 20.92% | 28.12% | 31.56% | 34.41% | 36.62% | 38.86% | 40.35% | 41.09% | 41.84% |
| Non-green oil and gas | 1.00% | 1.95% | 2.72% | 3.28% | 3.68% | 3.96% | 4.14% | 4.28% | 4.36% | 4.44% |
| Social | 0.12% | 0.23% | 0.29% | 0.34% | 0.36% | 0.39% | 0.41% | 0.44% | 0.45% | 0.45% |
| Total data sample | 0.70% | 1.37% | 1.92% | 2.33% | 2.64% | 2.86% | 3.00% | 3.09% | 3.14% | 3.17% |
| Green infrastructure | 0.81% | 1.51% | 2.14% | 2.65% | 3.03% | 3.28% | 3.49% | 3.71% | 3.78% | 3.86% |
| Non-green infrastructure | 0.75% | 1.52% | 2.26% | 2.88% | 3.35% | 3.75% | 4.01% | 4.18% | 4.27% | 4.34% |
| Green power | 0.43% | 0.87% | 1.28% | 1.60% | 1.83% | 2.02% | 2.10% | 2.12% | 2.14% | 2.15% |
| Non-green power | 1.27% | 2.49% | 3.39% | 4.02% | 4.55% | 4.89% | 5.06% | 5.18% | 5.26% | 5.28% |
| Green oil and gas | 10.62% | 20.18% | 27.16% | 30.52% | 33.32% | 35.52% | 37.77% | 39.29% | 40.05% | 40.81% |
| Non-green oil and gas | 0.87% | 1.69% | 2.35% | 2.84% | 3.18% | 3.42% | 3.57% | 3.70% | 3.77% | 3.83% |
| Social | 0.12% | 0.23% | 0.29% | 0.34% | 0.36% | 0.39% | 0.41% | 0.44% | 0.45% | 0.45% |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

## Recovery rate analysis

Recovery metrics for the total data sample (Basel and Moody's) are consistent with our findings in the March 2020 study.

Exhibit 47

**Summary of recovery metrics by regional subsets (Basel)**

| | Ultimate Recovery Rates (Basel) | | | | Distressed Sales (Basel) | | |
|---|---|---|---|---|---|---|---|
| | Recoveries | Average ultimate recovery rate | Standard deviation | Years to emergence from default | Recoveries | Average recovery rate | Standard deviation |
| EEA | 66 | 83.8% | 28.7% | 2.3 | 17 | 49.8% | 20.4% |
| EEA/OECD | 160 | 82.2% | 29.1% | 2.2 | 32 | 49.8% | 22.2% |
| EMDE-A | 42 | 80.0% | 30.6% | 2.7 | 11 | 45.9% | 20.9% |
| EMDE-B | 33 | 77.8% | 32.6% | 2.8 | 10 | 47.9% | 20.9% |
| Total regional subsets | 193 | 81.4% | 29.7% | 2.3 | 42 | 49.3% | 21.6% |
| Total data sample | 194 | 81.5% | 29.6% | 2.3 | 42 | 49.3% | 21.6% |
| | | | | | | | |
| Africa | 0 | n/a | n/a | n/a | 0 | n/a | n/a |
| Asia | 16 | 81.8% | 28.6% | 3.6 | 3 | 53.0% | 19.5% |
| Eastern Europe | 2 | 95.8% | 6.0% | 3.3 | 0 | n/a | n/a |
| Latin America | 22 | 77.5% | 34.1% | 2.2 | 7 | 45.7% | 22.6% |
| Middle East | 0 | n/a | n/a | n/a | 0 | n/a | n/a |
| North America | 79 | 79.8% | 30.0% | 2.1 | 14 | 49.5% | 25.6% |
| Oceania | 10 | 86.2% | 29.0% | 2.1 | 1 | 53.7% | n/a |
| Western Europe | 65 | 83.7% | 28.9% | 2.2 | 17 | 49.8% | 20.4% |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 47 indicates a broad consistency of average ultimate recovery rates (Basel) and average recovery rates for distressed sales across the regional subsets for advanced economies and EMDEs. The average ultimate recovery rate for the total data sample is 81.5% (Basel), similar to the 77.9% (Basel) reported for the total study data set in our March 2020 study.

On average, projects emerge slightly faster from default in more advanced economies, likely because of established institutional structures and more predictable legal processes. Projects in the EMDE subsets emerged from default after 2.7-2.8 years, slightly higher than the 2.2-2.3 years observed for projects in the advanced economy subsets. The average years to emergence for the EMDE subsets improved from 3.3 years reported in our September 2018 report as we added more ultimate recoveries to the data set.

Ultimate recovery rates (Basel) for workouts are substantially greater than for distressed sale exits (Basel).

Ultimate recovery values exclude any recoveries under political risk insurance arrangements.

Average ultimate recovery rates (Basel), average recovery rates (Basel) for distressed sales exit, and average years to emergence from default (Basel) show greater variation by our second regional classification. Eastern Europe and Oceania have sample sizes that may be too small to support statistically robust conclusions.

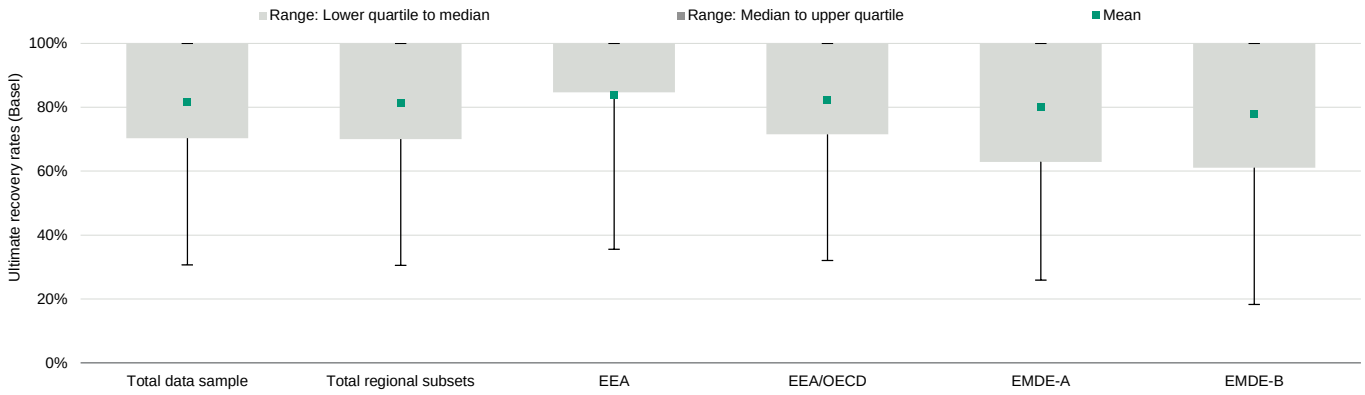
Exhibit 48 shows the variability of average ultimate recovery rates (Basel) for the regional subsets.

The distribution of ultimate recovery rates shows a higher proportion of transactions at either end of the recovery spectrum. This is consistent with ultimate recovery rates for corporate loans. The standard deviation for ultimate recoveries (Basel) is in the range of 28.7%-32.6% (Basel) and compares to a standard deviation of 29.4% for our Moody's corporate bank loan data set.

The median ultimate recovery rate (Basel) for all regional subsets is 100%, that is, they have restructured without incurring any economic loss. However, the distribution of ultimate recovery rates exhibits heavy-tails or high kurtosis. Around 9.3% of observations achieved an average ultimate recovery rate in the range of 0%-24%. This compares favorably with the total data set of the March 2020 study, where around 19.1% of observations achieved an average ultimate recovery in the range of 0-24%.

The 10th percentile and the lower quartile (25% quartile) are lower for the EMDE subsets than for the EEA and EEA/OECD subsets. This suggests that the EMDE subsets include a higher share of ultimate recoveries below the median.

Exhibit 48
**Variability of ultimate recovery rates (Basel) by regional subsets**

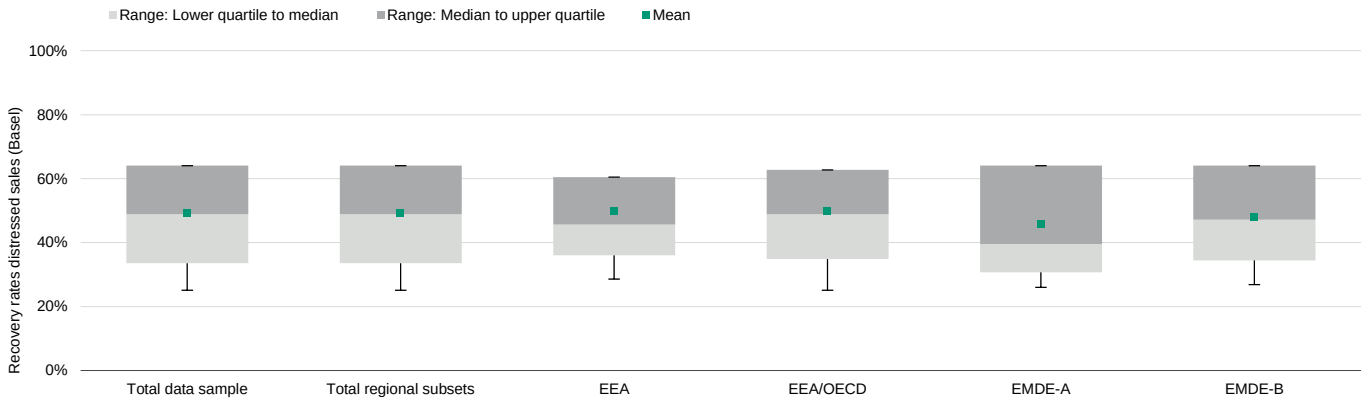



Note: Whiskers denote 10th and 90th percentile
*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 49 shows the variability of average recovery rates for distressed sales (Basel), for the regional subsets. The variability of distress sale recovery rates is more similar across regional subsets, reflected also in a lower standard deviation.

When a lender chooses to realize recoveries from a defaulted loan via a distressed sale, the average economic loss is likely to be substantially higher than if the lender "worked out" the defaulted loan and realized the average ultimate recovery rate. However, there are many reasons why an individual lender may choose to exit from a defaulted loan exposure via a distressed sale, rather than participate in a lengthy workout process.

Exhibit 49
**Variability of recovery rates for distressed sales (Basel) by regional subsets**




Note: Whiskers denote 10th and 90th percentile
*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 50 provides similar information as Exhibit 48, but is based on Moody's definition of default. Observations are comparable to those based on the Basel definition of default.

Exhibit 50

**Summary of recovery metrics by regional subsets (Moody's)**

| | Ultimate Recovery Rates (Moody's) | | | | Distressed Sales (Moody's) | | |
|---|---|---|---|---|---|---|---|
| | Recoveries | Average ultimate recovery rate | Standard deviation | Years to emergence from default | Recoveries | Average recovery rate | Standard deviation |
| EEA | 44 | 79.6% | 30.9% | 2.7 | 9 | 42.2% | 15.2% |
| EEA/OECD | 129 | 79.4% | 30.5% | 2.4 | 20 | 44.8% | 20.2% |
| EMDE-A | 39 | 80.9% | 29.1% | 2.8 | 10 | 47.9% | 20.9% |
| EMDE-B | 31 | 79.4% | 30.8% | 3.0 | 10 | 47.9% | 20.9% |
| Total regional subsets | 160 | 79.4% | 30.4% | 2.5 | 30 | 45.9% | 20.1% |
| Total data sample | 161 | 79.5% | 30.4% | 2.5 | 30 | 45.9% | 20.1% |
| | | | | | | | |
| Africa | 0 | n/a | n/a | n/a | 0 | n/a | n/a |
| Asia | 16 | 81.8% | 28.6% | 3.6 | 3 | 53.0% | 19.5% |
| Eastern Europe | 2 | 95.8% | 6.0% | 3.3 | 0 | n/a | n/a |
| Latin America | 19 | 78.9% | 31.9% | 2.4 | 7 | 45.7% | 22.6% |
| Middle East | 0 | n/a | n/a | n/a | 0 | n/a | n/a |
| North America | 71 | 77.9% | 31.0% | 2.1 | 11 | 47.0% | 24.1% |
| Oceania | 10 | 86.2% | 29.0% | 2.1 | 0 | n/a | n/a |
| Western Europe | 43 | 79.3% | 31.2% | 2.7 | 9 | 42.2% | 15.2% |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 51 shows average ultimate recovery rates and distressed sale recovery rates (Basel) by use-of-proceeds within each regional subset.

Average ultimate recovery rates, average distressed sale recovery rates and average years to emergence from default vary by use-of-proceeds and region. The data set includes fewer observations in particular for social use-of-proceeds projects as well as green use-of-proceeds projects in EMDE-B.

Ultimate recovery rates:

» For the total data sample, ultimate recovery rates for green projects average around 78.0%. This is slightly below the total average of 81.5% for the data sample and below the average of 84.2% for non-green projects.

» Ultimate recovery rates for green projects in advanced economies fall within a range of 78.7%-88.7%, compared with a range of 71.9%-76.7% in EMDEs.

» Ultimate recovery rates for non-green projects in advanced economies fall within a range of 82.9%-85.1% compared with a range of 80.5%-82.4% for EMDEs.

» Social projects have the lowest average ultimate recovery rate of 66.2% for the total data sample, but we base this finding on only 8 observations. EMDEs only include one recovery count for social projects with an average ultimate recovery rate of 68.5%.

Years to emergence from default:

» For the total data sample, green projects take on average 1.8 years to emerge from default, slightly faster than non-green projects (2.5 years) and social projects (2.4 years).

» Years to emerge from default for green projects in advanced economies average between 1.5-1.8 years, slightly better than for green projects in EMDEs (1.8-2.4 years).

» Years to emerge from default for non-green projects in advanced economies average between 2.5-2.8 years, slightly better than for non-green projects in EMDEs (2.9-3.1 years).

» Years to emerge from default for social projects in advanced economies average between 2.3-2.4 years. In EMDEs, the only social project included in these subsets needed 4.5 years to emerge from default.

Distressed sale recovery rates:

» For the total data sample, average distressed sale recovery rates for green projects (49.0%) and non-green projects (49.1%) are similar.

» Distressed sale recovery rates for green projects in advanced economies fall within a range of 48.4%-63.5% compared with 40.4%-54.8% for EMDEs.

» Distressed sale recovery rates for non-green projects in advanced economies average between 39.4%-49.9% and around 47.2% in EMDEs.

» Distress sale recovery rates for social projects are based on only one count of observation with an average recovery rate of 36.0%.

Exhibit 51

**Recovery metrics (Basel) by use-of-proceeds and regional subsets**

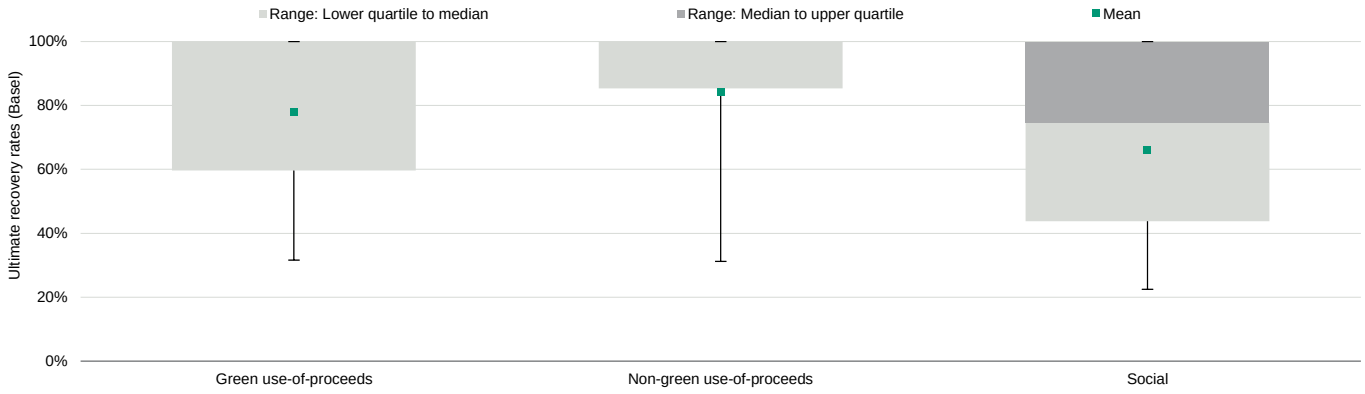
| | Ultimate Recovery Rates (Basel) | | | | Distressed Sales (Basel) | | |
|---|---|---|---|---|---|---|---|
| | Recoveries | Average ultimate recovery rate | Standard deviation | Years to emergence from default | Recoveries | Average recovery rate | Standard deviation |
| EEA | 66 | 83.8% | 28.7% | 2.3 | 17 | 49.8% | 20.4% |
| Green use-of-proceeds | 23 | 88.7% | 22.8% | 1.5 | 6 | 63.5% | 21.0% |
| Non-green use-of-proceeds | 36 | 82.9% | 30.3% | 2.8 | 9 | 39.4% | 13.9% |
| Social | 6 | 71.4% | 40.5% | 2.3 | 1 | 36.0% | n/a |
| Other | 1 | 78.8% | n/a | 2.4 | 1 | 75.0% | n/a |
| EEA/OECD | 160 | 82.2% | 29.1% | 2.2 | 32 | 49.8% | 22.2% |
| Green use-of-proceeds | 51 | 78.7% | 29.4% | 1.8 | 10 | 48.4% | 25.8% |
| Non-green use-of-proceeds | 101 | 85.1% | 27.9% | 2.5 | 20 | 49.9% | 21.0% |
| Social | 7 | 65.8% | 39.9% | 2.4 | 1 | 36.0% | n/a |
| Other | 1 | 78.8% | n/a | 2.4 | 1 | 75.0% | n/a |
| EMDE-A | 42 | 80.0% | 30.6% | 2.7 | 11 | 45.9% | 20.9% |
| Green use-of-proceeds | 15 | 76.7% | 30.0% | 1.8 | 2 | 40.4% | 20.4% |
| Non-green use-of-proceeds | 26 | 82.4% | 31.8% | 3.1 | 9 | 47.2% | 22.0% |
| Social | 1 | 68.5% | n/a | 4.5 | 0 | n/a | n/a |
| Other | 0 | n/a | n/a | n/a | 0 | n/a | n/a |
| EMDE-B | 33 | 77.8% | 32.6% | 2.8 | 10 | 47.9% | 20.9% |
| Green use-of-proceeds | 9 | 71.9% | 33.4% | 2.4 | 1 | 54.8% | n/a |
| Non-green use-of-proceeds | 23 | 80.5% | 33.4% | 2.9 | 9 | 47.2% | 22.0% |
| Social | 1 | 68.5% | n/a | 4.5 | 0 | n/a | n/a |
| Other | 0 | n/a | n/a | n/a | 0 | n/a | n/a |
| Total regional subsets | 193 | 81.4% | 29.7% | 2.3 | 42 | 49.3% | 21.6% |
| Green use-of-proceeds | 60 | 77.6% | 29.9% | 1.8 | 11 | 49.0% | 24.6% |
| Non-green use-of-proceeds | 124 | 84.2% | 28.9% | 2.5 | 29 | 49.1% | 20.9% |
| Social | 8 | 66.2% | 36.9% | 2.4 | 1 | 36.0% | n/a |
| Other | 1 | 78.8% | n/a | 2.4 | 1 | 75.0% | n/a |
| Total data sample | 194 | 81.5% | 29.6% | 2.3 | 42 | 49.3% | 21.6% |
| Green use-of-proceeds | 61 | 78.0% | 29.7% | 1.8 | 11 | 49.0% | 24.6% |
| Non-green use-of-proceeds | 124 | 84.2% | 28.9% | 2.5 | 29 | 49.1% | 20.9% |
| Social | 8 | 66.2% | 36.9% | 2.4 | 1 | 36.0% | n/a |
| Other | 1 | 78.8% | n/a | 2.4 | 1 | 75.0% | n/a |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 52 shows the variability of average ultimate recovery rates (Basel) by use-of-proceeds for the total data sample. The median recovery rate for both green and non-green projects is 100%, while it is 74.7% for social projects. Ultimate recovery rates for green projects show a greater variability than for non-green projects. Recovery rates for green and social projects are based on substantially fewer observations than for non-green projects.

Exhibit 52

**Variability of average ultimate recovery rate (Basel) by use-of-proceeds for the total data sample**

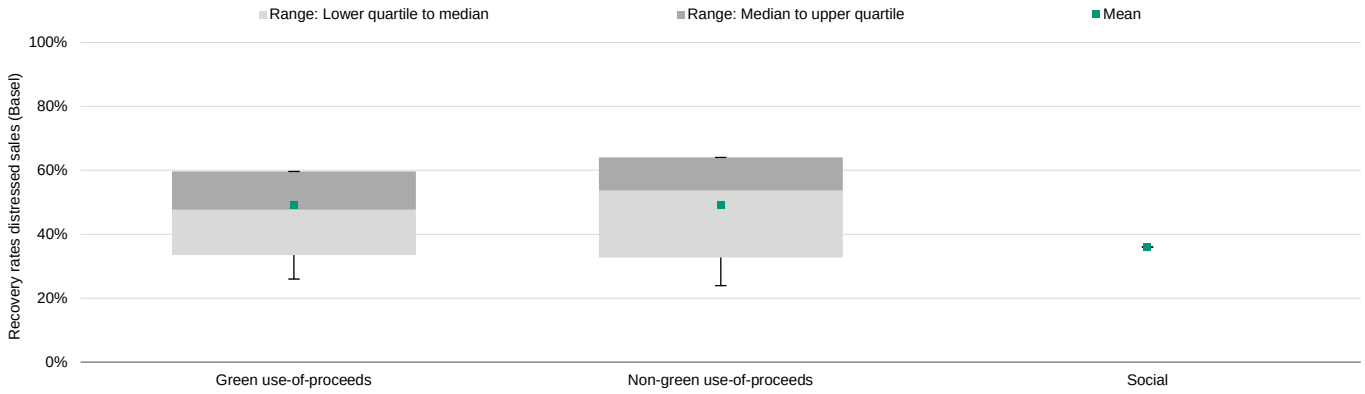



Note: Whiskers denote 10th and 90th percentile
*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 53 shows the variability of average recovery rates for distressed sales (Basel) by use-of-proceeds for the total data sample.

Exhibit 53

**Variability of distressed sales recovery rates (Basel) by use-of-proceeds for the total data sample**




Note: Whiskers denote 10th and 90th percentile
*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 54 shows average ultimate recovery rates and distressed sale recovery rates (Moody's) by use-of-proceeds within each regional subset.

Average ultimate recovery rates, average distressed sale recovery rates and average years to emergence from default vary by use-of-proceeds. The data sample includes few ultimate recoveries and distressed sale recoveries, in particular for social projects as well as green projects in EEA, EMDE-A and EMDE-B.

Exhibit 54

**Recovery metrics (Moody's) by use-of-proceeds and regional subsets**

| | Ultimate Recovery Rates (Moody's) | | | | Distressed Sales (Moody's) | | |
|---|---|---|---|---|---|---|---|
| | Recoveries | Average ultimate recovery rate | Standard deviation | Years to emergence from default | Recoveries | Average recovery rate | Standard deviation |
| EEA | 44 | 79.6% | 30.9% | 2.7 | 9 | 42.2% | 15.2% |
| Green use-of-proceeds | 12 | 79.1% | 28.8% | 2.1 | 4 | 50.9% | 9.8% |
| Non-green use-of-proceeds | 26 | 82.6% | 30.6% | 3.0 | 5 | 35.2% | 15.9% |
| Social | 5 | 65.7% | 42.5% | 2.7 | 0 | n/a | n/a |
| Other | 1 | 78.8% | n/a | 2.4 | 0 | n/a | n/a |
| EEA/OECD | 129 | 79.4% | 30.5% | 2.4 | 20 | 44.8% | 20.2% |
| Green use-of-proceeds | 38 | 71.6% | 31.1% | 2.0 | 7 | 40.1% | 17.1% |
| Non-green use-of-proceeds | 84 | 84.3% | 28.7% | 2.7 | 13 | 47.4% | 21.9% |
| Social | 6 | 60.1% | 40.4% | 2.7 | 0 | n/a | n/a |
| Other | 1 | 78.8% | n/a | 2.4 | 0 | n/a | n/a |
| EMDE-A | 39 | 80.9% | 29.1% | 2.8 | 10 | 47.9% | 20.9% |
| Green use-of-proceeds | 14 | 75.0% | 30.4% | 1.9 | 1 | 54.8% | n/a |
| Non-green use-of-proceeds | 24 | 84.8% | 28.8% | 3.3 | 9 | 47.2% | 22.0% |
| Social | 1 | 68.5% | n/a | 4.5 | 0 | n/a | n/a |
| Other | 0 | n/a | n/a | n/a | 0 | n/a | n/a |
| EMDE-B | 31 | 79.4% | 30.8% | 3.0 | 10 | 47.9% | 20.9% |
| Green use-of-proceeds | 9 | 71.9% | 33.4% | 2.4 | 1 | 54.8% | n/a |
| Non-green use-of-proceeds | 21 | 83.1% | 30.5% | 3.1 | 9 | 47.2% | 22.0% |
| Social | 1 | 68.5% | n/a | 4.5 | 0 | n/a | n/a |
| Other | 0 | n/a | n/a | n/a | 0 | n/a | n/a |
| Total regional subsets | 160 | 79.4% | 30.4% | 2.5 | 30 | 45.9% | 20.1% |
| Green use-of-proceeds | 47 | 71.7% | 31.2% | 2.0 | 8 | 41.9% | 16.7% |
| Non-green use-of-proceeds | 105 | 84.1% | 28.9% | 2.7 | 22 | 47.3% | 21.4% |
| Social | 7 | 61.3% | 37.0% | 2.7 | 0 | n/a | n/a |
| Other | 1 | 78.8% | n/a | 2.4 | 0 | n/a | n/a |
| Total data sample | 161 | 79.5% | 30.4% | 2.5 | 30 | 45.9% | 20.1% |
| Green use-of-proceeds | 48 | 72.3% | 31.1% | 1.9 | 8 | 41.9% | 16.7% |
| Non-green use-of-proceeds | 105 | 84.1% | 28.9% | 2.7 | 22 | 47.3% | 21.4% |
| Social | 7 | 61.3% | 37.0% | 2.7 | 0 | n/a | n/a |
| Other | 1 | 78.8% | n/a | 2.4 | 0 | n/a | n/a |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 55 shows recovery metrics (Basel) by use-of-proceeds and by industry within each regional subset. Average ultimate recovery rates, average years to emerge from default and average distressed sales recovery rates vary widely by industry sector, use-of-proceeds and by region.

In general green and non-green power projects have average ultimate recovery rates above the data sample average of 81.5% across most regions. We commented on the high average ultimate recovery rates of the power industry already in our March 2020 study.

Social projects (66.2% for total data sample) and green oil and gas projects (63.4% for total data sample) have one of the lowest average ultimate recovery rates. However, given the low count of observations for social and green oil and gas projects, a single observation can easily skew the average. For example, the green oil and gas subset comprises 16 observations, including one 15.7% recovery rate in EEA.

For social projects the total data sample includes only eight recoveries. The limited count of recovery rate observations also reflects the low default risk of social projects. The low average ultimate recovery rate is driven by three projects with a very low average ultimate recovery rate below 40%, driving down the overall average for social projects.

Exhibit 55

**Recovery metrics (Basel) by use-of-proceeds and by industry and regional subsets**

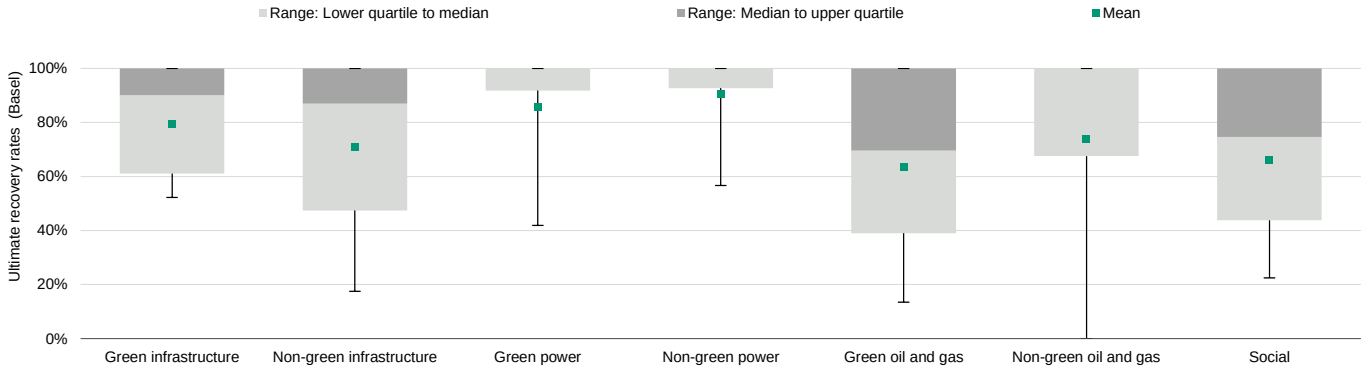
| | Ultimate Recovery Rates (Basel) | | | | Distressed Sales (Basel) | | |
|---|---|---|---|---|---|---|---|
| | Recoveries | Average ultimate recovery rate | Standard deviation | Years to emergence from default | Recoveries | Average recovery rate | Standard deviation |
| EEA | 66 | 83.8% | 28.7% | 2.3 | 17 | 49.8% | 20.4% |
| Green infrastructure | 8 | 85.5% | 22.7% | 1.4 | 1 | 85.0% | n/a |
| Non-green infrastructure | 14 | 69.5% | 38.2% | 4.2 | 7 | 36.4% | 13.2% |
| Green power | 14 | 95.7% | 11.7% | 1.6 | 5 | 59.2% | 20.3% |
| Non-green power | 20 | 91.4% | 21.8% | 1.9 | 2 | 49.9% | 14.9% |
| Green oil and gas | 1 | 15.7% | n/a | 1.8 | 0 | n/a | n/a |
| Non-green oil and gas | 2 | 92.7% | 10.3% | 0.7 | 0 | n/a | n/a |
| Social | 6 | 71.4% | 40.5% | 2.3 | 1 | 36.0% | n/a |
| EEA/OECD | 160 | 82.2% | 29.1% | 2.2 | 32 | 49.8% | 22.2% |
| Green infrastructure | 13 | 81.3% | 23.1% | 1.5 | 1 | 85.0% | n/a |
| Non-green infrastructure | 20 | 69.3% | 34.2% | 3.8 | 11 | 45.1% | 16.4% |
| Green power | 24 | 87.3% | 24.9% | 1.7 | 9 | 44.3% | 23.8% |
| Non-green power | 70 | 92.2% | 18.6% | 2.0 | 8 | 62.0% | 18.2% |
| Green oil and gas | 14 | 61.5% | 35.8% | 2.0 | 0 | n/a | n/a |
| Non-green oil and gas | 11 | 68.4% | 45.1% | 2.6 | 1 | 6.1% | n/a |
| Social | 7 | 65.8% | 39.9% | 2.0 | 1 | 36.0% | n/a |
| EMDE-A | 42 | 80.0% | 30.6% | 2.7 | 11 | 45.9% | 20.9% |
| Green infrastructure | 5 | 59.4% | 9.1% | 3.7 | 0 | n/a | n/a |
| Non-green infrastructure | 2 | 100.0% | 0.0% | 3.4 | 0 | n/a | n/a |
| Green power | 8 | 87.5% | 35.4% | 1.0 | 2 | 40.4% | 20.4% |
| Non-green power | 13 | 80.5% | 33.3% | 3.8 | 7 | 51.9% | 23.0% |
| Green oil and gas | 2 | 76.5% | 33.2% | 0.3 | 0 | n/a | n/a |
| Non-green oil and gas | 11 | 81.5% | 33.6% | 2.3 | 2 | 30.7% | 2.9% |
| Social | 1 | 68.5% | n/a | 4.5 | 0 | n/a | n/a |
| EMDE-B | 33 | 77.8% | 32.6% | 2.8 | 10 | 47.9% | 20.9% |
| Green infrastructure | 3 | 64.8% | 6.5% | 5.3 | 0 | n/a | n/a |
| Non-green infrastructure | 1 | 100.0% | n/a | 1.3 | 0 | n/a | n/a |
| Green power | 4 | 75.0% | 50.0% | 1.4 | 1 | 54.8% | n/a |
| Non-green power | 12 | 79.6% | 34.6% | 4.0 | 7 | 51.9% | 23.0% |
| Green oil and gas | 2 | 76.5% | 33.2% | 0.3 | 0 | n/a | n/a |
| Non-green oil and gas | 10 | 79.6% | 34.9% | 1.8 | 2 | 30.7% | 2.9% |
| Social | 1 | 68.5% | n/a | 4.5 | 0 | n/a | n/a |
| Total regional subsets | 193 | 81.4% | 29.7% | 2.3 | 42 | 49.3% | 21.6% |
| Green infrastructure | 16 | 78.2% | 21.8% | 2.2 | 1 | 85.0% | n/a |
| Non-green infrastructure | 21 | 70.7% | 34.0% | 3.7 | 11 | 45.1% | 16.4% |
| Green power | 28 | 85.5% | 28.7% | 1.7 | 10 | 45.4% | 22.7% |
| Non-green power | 82 | 90.4% | 21.9% | 2.3 | 15 | 57.2% | 20.5% |
| Green oil and gas | 16 | 63.4% | 34.8% | 1.8 | 0 | n/a | n/a |
| Non-green oil and gas | 21 | 73.8% | 39.9% | 2.2 | 3 | 22.5% | 14.4% |
| Social | 8 | 66.2% | 36.9% | 2.4 | 1 | 36.0% | n/a |
| Total data sample | 194 | 81.5% | 29.6% | 2.3 | 42 | 49.3% | 21.6% |
| Green infrastructure | 17 | 79.4% | 21.8% | 2.1 | 1 | 85.0% | n/a |
| Non-green infrastructure | 21 | 70.7% | 34.0% | 3.7 | 11 | 45.1% | 16.4% |
| Green power | 28 | 85.5% | 28.7% | 1.7 | 10 | 45.4% | 22.7% |
| Non-green power | 82 | 90.4% | 21.9% | 2.3 | 15 | 57.2% | 20.5% |
| Green oil and gas | 16 | 63.4% | 34.8% | 1.8 | 0 | n/a | n/a |
| Non-green oil and gas | 21 | 73.8% | 39.9% | 2.2 | 3 | 22.5% | 14.4% |
| Social | 8 | 66.2% | 36.9% | 2.4 | 1 | 36.0% | n/a |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 56 shows the variability of average ultimate recovery rates (Basel) by use-of-proceeds for the total data sample. The median recovery for green power, non-green power, non-green oil and gas is 100%. The median for green infrastructure is 90.1%, for non-green infrastructure 87%, for green oil and gas 69.6% and for social 74.7%

Exhibit 56

**Variability of average ultimate recovery rate (Basel) by use-of-proceeds and by industry for the total data sample**



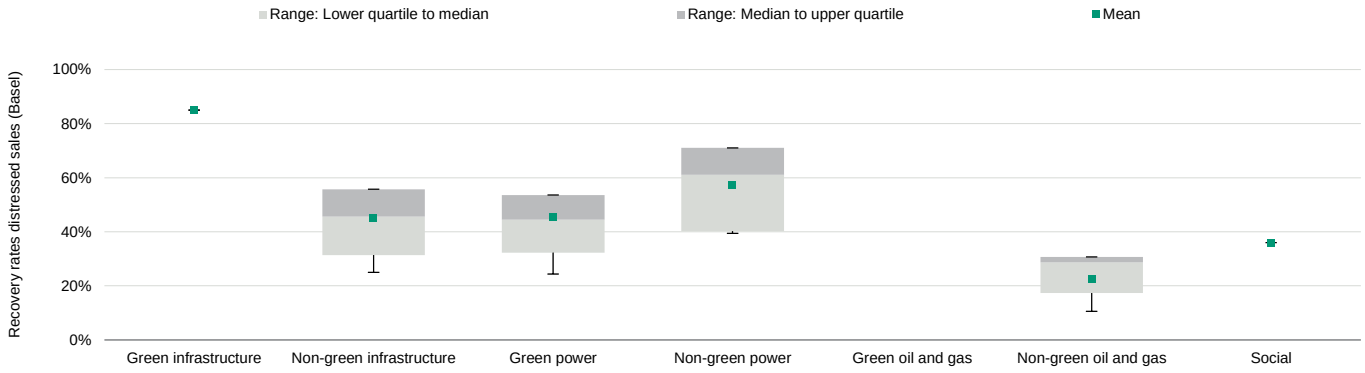

Note: Whiskers denote 10th and 90th percentile

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 57 shows the variability of average recovery rates for distressed sales (Basel) by use-of-proceeds for the total data sample.

Exhibit 57

**Variability of average distressed sale recovery rate (Basel) by use-of-proceeds and by industry for the total data sample**




Note: Whiskers denote 10th and 90th percentile

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

Exhibit 58 shows recovery metrics (Moody's) by use-of-proceeds and by industry within each regional subset. The total data sample includes 161 recoveries, 33 fewer observations than based on the Basel definition of default. Recovery metrics based on Moody's definition of default show greater variability across subsets than based on the Basel definition of default.

Exhibit 58

## Recovery metrics (Moody's) by use-of-proceeds and by industry and regional subsets

| | Ultimate Recovery Rates (Moody's) | | | | Distressed Sales (Moody's) | | |
|---|---|---|---|---|---|---|---|
| | Recoveries | Average ultimate recovery rate | Standard deviation | Years to emergence from default | Recoveries | Average recovery rate | Standard deviation |
| EEA | 44 | 79.6% | 30.9% | 2.7 | 9 | 42.2% | 15.2% |
| Green infrastructure | 5 | 78.7% | 27.2% | 1.7 | 0 | n/a | n/a |
| Non-green infrastructure | 8 | 66.7% | 41.1% | 5.7 | 3 | 25.5% | 6.1% |
| Green power | 6 | 90.0% | 16.9% | 2.5 | 4 | 50.9% | 9.8% |
| Non-green power | 16 | 89.2% | 24.0% | 2.0 | 2 | 49.9% | 14.9% |
| Green oil and gas | 1 | 15.7% | n/a | 1.8 | 0 | n/a | n/a |
| Non-green oil and gas | 2 | 92.7% | 10.3% | 0.7 | 0 | n/a | n/a |
| Social | 5 | 65.7% | 42.5% | 2.7 | 0 | n/a | n/a |
| EEA/OECD | 129 | 79.4% | 30.5% | 2.4 | 20 | 44.8% | 20.2% |
| Green infrastructure | 10 | 76.6% | 24.5% | 1.7 | 0 | n/a | n/a |
| Non-green infrastructure | 13 | 66.1% | 35.0% | 4.8 | 5 | 41.9% | 23.2% |
| Green power | 14 | 78.2% | 29.7% | 1.9 | 7 | 40.1% | 17.1% |
| Non-green power | 60 | 91.2% | 19.9% | 2.1 | 7 | 57.2% | 13.3% |
| Green oil and gas | 14 | 61.5% | 35.8% | 2.0 | 0 | n/a | n/a |
| Non-green oil and gas | 11 | 68.4% | 45.1% | 2.6 | 1 | 6.1% | n/a |
| Social | 6 | 60.1% | 40.4% | 2.4 | 0 | n/a | n/a |
| EMDE-A | 39 | 80.9% | 29.1% | 2.8 | 10 | 47.9% | 20.9% |
| Green infrastructure | 5 | 59.4% | 9.1% | 3.7 | 0 | n/a | n/a |
| Non-green infrastructure | 2 | 100.0% | 0.0% | 3.4 | 0 | n/a | n/a |
| Green power | 7 | 85.7% | 37.8% | 1.1 | 1 | 54.8% | n/a |
| Non-green power | 12 | 86.6% | 26.0% | 4.0 | 7 | 51.9% | 23.0% |
| Green oil and gas | 2 | 76.5% | 33.2% | 0.3 | 0 | n/a | n/a |
| Non-green oil and gas | 10 | 79.6% | 34.9% | 2.5 | 2 | 30.7% | 2.9% |
| Social | 1 | 68.5% | n/a | 4.5 | 0 | n/a | n/a |
| EMDE-B | 31 | 79.4% | 30.8% | 3.0 | 10 | 47.9% | 20.9% |
| Green infrastructure | 3 | 64.8% | 6.5% | 5.3 | 0 | n/a | n/a |
| Non-green infrastructure | 1 | 100.0% | n/a | 1.3 | 0 | n/a | n/a |
| Green power | 4 | 75.0% | 50.0% | 1.4 | 1 | 54.8% | n/a |
| Non-green power | 11 | 86.2% | 27.2% | 4.3 | 7 | 51.9% | 23.0% |
| Green oil and gas | 2 | 76.5% | 33.2% | 0.3 | 0 | n/a | n/a |
| Non-green oil and gas | 9 | 77.3% | 36.2% | 2.0 | 2 | 30.7% | 2.9% |
| Social | 1 | 68.5% | n/a | 4.5 | 0 | n/a | n/a |
| Total regional subsets | 160 | 79.4% | 30.4% | 2.5 | 30 | 45.9% | 20.1% |
| Green infrastructure | 13 | 73.9% | 22.0% | 2.5 | 0 | n/a | n/a |
| Non-green infrastructure | 14 | 68.5% | 34.8% | 4.5 | 5 | 41.9% | 23.2% |
| Green power | 18 | 77.5% | 33.4% | 1.8 | 8 | 41.9% | 16.7% |
| Non-green power | 71 | 90.4% | 21.0% | 2.4 | 14 | 54.5% | 18.3% |
| Green oil and gas | 16 | 63.4% | 34.8% | 1.8 | 0 | n/a | n/a |
| Non-green oil and gas | 20 | 72.5% | 40.5% | 2.3 | 3 | 22.5% | 14.4% |
| Social | 7 | 61.3% | 37.0% | 2.7 | 0 | n/a | n/a |
| Total data sample | 161 | 79.5% | 30.4% | 2.5 | 30 | 45.9% | 20.1% |
| Green infrastructure | 14 | 75.7% | 22.3% | 2.3 | 0 | n/a | n/a |
| Non-green infrastructure | 14 | 68.5% | 34.8% | 4.5 | 5 | 41.9% | 23.2% |
| Green power | 18 | 77.5% | 33.4% | 1.8 | 8 | 41.9% | 16.7% |
| Non-green power | 71 | 90.4% | 21.0% | 2.4 | 14 | 54.5% | 18.3% |
| Green oil and gas | 16 | 63.4% | 34.8% | 1.8 | 0 | n/a | n/a |
| Non-green oil and gas | 20 | 72.5% | 40.5% | 2.3 | 3 | 22.5% | 14.4% |
| Social | 7 | 61.3% | 37.0% | 2.7 | 0 | n/a | n/a |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

## Appendix 1: Summary of findings for projects with different revenue characteristics

Appendix 1 summarizes our key findings for projects with different revenue resilience characteristics for the total data sample. We have classified projects as those with availability-based or non-availability-based payment mechanisms and also distinguished between public-private partnerships (PPPs) and non-PPP projects.

The 7,354 projects included in this report have been further segmented into 5,425 non-PPP projects (73.8%) and 1,929 PPP projects (26.2%). Availability-based projects make up 24.9% of the total data sample.

Power projects that benefit from purchase power agreements are typically not classified as availability-based projects in the total study but often have characteristics that provide greater revenue visibility than for merchant power projects. Renewable power projects generally benefit from purchase power agreements, which might partially explain the lower 10-year CDRs for green power projects in many regions.

- Availability-based PPP projects lie at the low end of the risk spectrum, with a 10-year CDR of 1.9% (Basel) and 0.8% (Moody's). 85.7% of social use-of-proceeds projects included in the data sample are also availability-based PPP projects.
- Projects with availability-based revenue schemes and PPP projects are less prevalent as a procuring method and payment mechanism in emerging markets. The project count is relatively low for these type of projects in the EMDE-A and EMDE-B subsets. Demand risk projects may be the preferred option in these markets due to the limited creditworthiness of some governmental offtakers or fewer funds available at the offtaker level to support the availability-based payments.
- Demand risk projects have substantially higher default rates in advanced economies than projects with availability-based payment mechanisms. This is however, not the case in the EMDE subsets.
- Average ultimate recovery rates vary by revenue characteristics but are also heavily influenced by a low count of recoveries, in particular for availability-based PPP projects across regional subsets.

**Availability-based and non-availability-based projects**

- Availability-based projects: Revenue from availability-based payments is not subject to swings in demand, such as traffic levels and is adjusted typically only for poor performance or lack of availability of the asset. Availability-based projects benefit from higher cash flow certainty than projects that are exposed to volatility in demand and revenue. We categorize "take or pay" and "capacity" contracts as availability-based revenue contracts.
- Non-availability-based projects: Projects that do not have availability-based revenue scheme. Such projects are subject to demand risk and/or price risk.
- Public-private partnerships (PPPs): There is no standard definition of what constitutes a PPP. A PPP is often defined as a long-term contractual agreement between a public sector governmental entity and a private developer to design, build, finance, operate and/or maintain an infrastructure asset for a specific period. The classification of a project as a PPP project in this report is based on its classification by the Data Consortium and involves some subjectivity. PPP projects are often referred to as P3 projects, and include PFI projects procured under the UK Government's Private Finance Initiative.
- Availability-based PPP: A PPP project with an availability-based payment scheme.
- Non-availability-based PPP: A PPP project with a non-availability-based payment scheme. Examples include toll roads or water, gas and electricity PPPs.

Exhibit 59

**Key findings by different revenue characteristics for the total data sample**

| | Project count | Default count (Basel) | Recovery count (Basel) | Avg. ultimate recovery rate (Basel) | 10-year CDR (Basel) | Default count (Moody's) | Recovery count (Moody's) | Avg. ultimate recovery count (Moody's) | 10-year CDR (Moody's) |
|---|---|---|---|---|---|---|---|---|---|
| **EEA** | **3313** | **188** | **66** | **83.8%** | **4.5%** | **92** | **44** | **79.6%** | **2.1%** |
| Availability-based PPPs | 858 | 28 | 7 | 74.1% | 2.1% | 11 | 3 | 42.9% | 0.7% |
| Non-availability PPPs | 563 | 48 | 14 | 79.5% | 7.2% | 19 | 7 | 81.9% | 2.8% |
| Availability-based, non-PPPs | 296 | 6 | 3 | 79.2% | 1.9% | 4 | 3 | 79.2% | 1.1% |
| Non-availability, non-PPPs | 1596 | 106 | 42 | 87.2% | 6.0% | 58 | 31 | 82.7% | 3.1% |
| PPP | 1421 | 76 | 21 | 77.7% | 3.8% | 30 | 10 | 70.2% | 1.5% |
| | | | | | | | | | |
| **EEA/OECD** | **6097** | **367** | **160** | **82.2%** | **5.0%** | **225** | **129** | **79.4%** | **2.9%** |
| Availability-based PPPs | 1054 | 31 | 8 | 68.9% | 1.9% | 13 | 4 | 40.2% | 0.7% |
| Non-availability PPPs | 728 | 61 | 20 | 78.2% | 7.4% | 28 | 12 | 78.1% | 3.4% |
| Availability-based, non-PPPs | 586 | 20 | 10 | 74.1% | 3.1% | 15 | 10 | 74.1% | 2.2% |
| Non-availability, non-PPPs | 3729 | 255 | 122 | 84.4% | 6.3% | 169 | 103 | 81.6% | 4.0% |
| PPP | 1782 | 92 | 28 | 75.5% | 3.8% | 41 | 16 | 68.6% | 1.7% |
| | | | | | | | | | |
| **EMDE-A** | **1307** | **112** | **42** | **80.0%** | **6.7%** | **86** | **39** | **80.9%** | **5.3%** |
| Availability-based PPPs | 62 | 2 | 1 | 68.5% | 3.2% | 2 | 1 | 68.5% | 3.5% |
| Non-availability PPPs | 157 | 7 | 2 | 100.0% | 3.4% | 4 | 2 | 100.0% | 2.2% |
| Availability-based, non-PPPs | 162 | 24 | 9 | 81.8% | 10.4% | 23 | 8 | 79.5% | 9.9% |
| Non-availability, non-PPPs | 926 | 79 | 30 | 78.6% | 6.9% | 57 | 28 | 80.4% | 5.1% |
| PPP | 219 | 9 | 3 | 89.5% | 3.3% | 6 | 3 | 89.5% | 2.6% |
| | | | | | | | | | |
| **EMDE-B** | **972** | **86** | **33** | **77.8%** | **6.8%** | **73** | **31** | **79.4%** | **6.0%** |
| Availability-based PPPs | 24 | 2 | 1 | 68.5% | 7.2% | 2 | 1 | 68.5% | 7.9% |
| Non-availability PPPs | 96 | 4 | 1 | 100.0% | 3.8% | 3 | 1 | 100.0% | 3.1% |
| Availability-based, non-PPPs | 115 | 21 | 6 | 88.9% | 12.6% | 20 | 5 | 86.6% | 12.0% |
| Non-availability, non-PPPs | 737 | 59 | 25 | 74.6% | 6.3% | 48 | 24 | 77.4% | 5.3% |
| PPP | 120 | 6 | 2 | 84.2% | 4.6% | 5 | 2 | 84.2% | 4.3% |
| | | | | | | | | | |
| **Total regional subsets** | **7069** | **453** | **193** | **81.4%** | **5.3%** | **298** | **160** | **79.4%** | **3.3%** |
| Availability-based PPPs | 1078 | 33 | 9 | 68.8% | 2.0% | 15 | 5 | 45.8% | 0.8% |
| Non-availability PPPs | 824 | 65 | 21 | 79.2% | 7.2% | 31 | 13 | 79.8% | 3.4% |
| Availability-based, non-PPPs | 701 | 41 | 16 | 79.6% | 4.7% | 35 | 15 | 78.2% | 3.9% |
| Non-availability, non-PPPs | 4466 | 314 | 147 | 82.7% | 6.3% | 217 | 127 | 80.8% | 4.3% |
| PPP | 1902 | 98 | 30 | 76.1% | 3.9% | 46 | 18 | 70.4% | 1.8% |
| | | | | | | | | | |
| **Total data sample** | **7354** | **454** | **194** | **81.5%** | **5.0%** | **299** | **161** | **79.5%** | **3.2%** |
| Availability-based PPPs | 1097 | 33 | 9 | 68.8% | 1.9% | 15 | 5 | 45.8% | 0.8% |
| Non-availability PPPs | 832 | 65 | 21 | 79.2% | 7.1% | 31 | 13 | 79.8% | 3.4% |
| Availability-based, non-PPPs | 736 | 41 | 16 | 79.6% | 4.4% | 35 | 15 | 78.2% | 3.7% |
| Non-availability, non-PPPs | 4689 | 315 | 148 | 82.8% | 5.9% | 218 | 128 | 81.0% | 4.0% |
| PPP | 1929 | 98 | 30 | 76.1% | 3.8% | 46 | 18 | 70.4% | 1.8% |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

## Appendix 2: Summary of key findings by region

Appendix 2 provides additional details on certain key findings by region. However, conclusions for subsets by region are limited by the smaller project count in Africa, Asia, Latin America, Eastern Europe, Middle East and Oceania than in Western Europe or North America.

Exhibit 60

**Key findings by region (Basel and Moody's definition of default)**

| | Project count | Default count (Basel) | Recovery count (Basel) | Avg. ultimate recovery rate (Basel) | 10-year CDR (Basel) | Default count (Moody's) | Recovery count (Moody's) | Avg.ultimate recovery rate (Moody's) | 10-year CDR (Moody's) |
|---|---|---|---|---|---|---|---|---|---|
| **Africa** | **312** | **12** | **0** | **n/a** | **4.8%** | **10** | **0** | **n/a** | **3.8%** |
| Green use-of-proceeds | 89 | 1 | 0 | n/a | 0.6% | 1 | 0 | n/a | 0.9% |
| Non-green use-of-proceeds | 213 | 11 | 0 | n/a | 6.7% | 9 | 0 | n/a | 5.1% |
| Social | 9 | 0 | 0 | n/a | n/a | 0 | 0 | n/a | n/a |
| Other | 1 | 0 | 0 | n/a | n/a | 0 | 0 | n/a | n/a |
| **Asia** | **496** | **26** | **16** | **81.8%** | **3.4%** | **23** | **16** | **81.8%** | **3.1%** |
| Green use-of-proceeds | 118 | 7 | 4 | 90.3% | 3.5% | 6 | 4 | 90.3% | 3.1% |
| Non-green use-of-proceeds | 331 | 18 | 11 | 79.9% | 3.8% | 16 | 11 | 79.9% | 3.6% |
| Social | 45 | 1 | 1 | 68.5% | 1.1% | 1 | 1 | 68.5% | 1.1% |
| Other | 2 | 0 | 0 | n/a | n/a | 0 | 0 | n/a | n/a |
| **Eastern Europe** | **104** | **14** | **2** | **95.8%** | **13.0%** | **7** | **2** | **95.8%** | **6.7%** |
| Green use-of-proceeds | 20 | 9 | 0 | n/a | 43.2% | 3 | 0 | n/a | 13.7% |
| Non-green use-of-proceeds | 78 | 5 | 2 | 95.8% | 6.2% | 4 | 2 | 95.8% | 5.2% |
| Social | 3 | 0 | 0 | n/a | n/a | 0 | 0 | n/a | n/a |
| Other | 3 | 0 | 0 | n/a | n/a | 0 | 0 | n/a | n/a |
| **Latin America** | **421** | **53** | **22** | **77.5%** | **8.8%** | **44** | **19** | **78.9%** | **8.1%** |
| Green use-of-proceeds | 138 | 13 | 9 | 70.4% | 8.6% | 11 | 8 | 66.7% | 9.3% |
| Non-green use-of-proceeds | 269 | 38 | 13 | 82.5% | 8.8% | 31 | 11 | 87.8% | 7.5% |
| Social | 7 | 1 | 0 | n/a | 9.4% | 1 | 0 | n/a | 9.4% |
| Other | 7 | 1 | 0 | n/a | 14.1% | 1 | 0 | n/a | 14.1% |
| **Middle East** | **268** | **1** | **0** | **n/a** | **0.5%** | **0** | **0** | **n/a** | **0.0%** |
| Green use-of-proceeds | 38 | 0 | 0 | n/a | n/a | 0 | 0 | n/a | n/a |
| Non-green use-of-proceeds | 209 | 1 | 0 | n/a | 0.6% | 0 | 0 | n/a | n/a |
| Social | 15 | 0 | 0 | n/a | n/a | 0 | 0 | n/a | n/a |
| Other | 6 | 0 | 0 | n/a | n/a | 0 | 0 | n/a | n/a |
| **North America** | **2135** | **154** | **79** | **79.8%** | **6.7%** | **113** | **71** | **77.9%** | **4.9%** |
| Green use-of-proceeds | 833 | 52 | 23 | 66.3% | 6.2% | 39 | 22 | 64.8% | 4.5% |
| Non-green use-of-proceeds | 1192 | 101 | 56 | 85.3% | 7.7% | 74 | 49 | 83.8% | 5.8% |
| Social | 88 | 0 | 0 | n/a | n/a | 0 | 0 | n/a | n/a |
| Other | 22 | 1 | 0 | n/a | 5.9% | 0 | 0 | n/a | n/a |
| **Oceania** | **368** | **18** | **10** | **86.2%** | **6.0%** | **15** | **10** | **86.2%** | **5.1%** |
| Green use-of-proceeds | 80 | 3 | 1 | 100.0% | 4.5% | 3 | 1 | 100.0% | 4.5% |
| Non-green use-of-proceeds | 245 | 14 | 8 | 91.3% | 7.6% | 11 | 8 | 91.3% | 6.0% |
| Social | 41 | 1 | 1 | 32.1% | 1.1% | 1 | 1 | 32.1% | 1.1% |
| Other | 2 | 0 | 0 | n/a | n/a | 0 | 0 | n/a | n/a |
| **Western Europe** | **3250** | **176** | **65** | **83.7%** | **4.3%** | **87** | **43** | **79.3%** | **2.0%** |
| Green use-of-proceeds | 1476 | 67 | 24 | 89.1% | 4.1% | 31 | 13 | 80.7% | 1.9% |
| Non-green use-of-proceeds | 945 | 90 | 34 | 82.2% | 9.0% | 48 | 24 | 81.5% | 4.1% |
| Social | 798 | 16 | 6 | 71.4% | 1.1% | 7 | 5 | 65.7% | 0.4% |
| Other | 31 | 3 | 1 | 78.8% | 11.8% | 1 | 1 | 78.8% | 5.3% |

*Source: Moody's Analytics Data Alliance Project Finance Data Consortium*

## Appendix 3: Glossary

Exhibit 61

**Glossary**

| | |
|---|---|
| Basel Framework | The Basel III reforms have now been integrated into the consolidated Basel Framework (https://www.bis.org/basel_framework/index.htm?m=3%7C14%7C697). |
| Corporate Bank Loan Data Set | A data set of corporate bank loans (predominantly senior secured) derived from Moody's Default & Recovery Analytics database (https://www.moodys.com/Pages/Default-and-Recovery-Analytics.aspx). |
| Cumulative Default Rates | Cumulative default rates are calculated from the weighted average marginal default rates (hazard rates) for all cohorts, based on the methodology described in Section 7.1 (Cohort analysis: 1990-2018) in the March 2020 study. |
| Moody's Analytics Data Alliance – Project Finance Data Consortium | A consortium of leading project finance lenders and investors that provide historical portfolio and credit loss data to Moody's Analytics for the purpose of creating an aggregate data set. For further information see the About the Moody's Analytics Data Alliance. |
| Default (Basel) | A default based on the Basel definition of default. We include below relevant extracts from the Basel Framework (paragraph 36.69 and 36.70):<br>"A default is considered to have occurred with regard to a particular obligor when either or both of the two following events have taken place.<br>(1) The bank considers that the obligor is unlikely to pay its credit obligations to the banking group in full, without recourse by the bank to actions such as realising security (if held).<br>(2) The obligor is past due more than 90 days on any material credit obligation to the banking group. Overdrafts will be considered as being past due once the customer has breached an advised limit or been advised of a limit smaller than current outstandings.<br>The elements to be taken as indications of unlikeliness to pay include:<br>(1) The bank puts the credit obligation on non-accrued status.<br>(2) The bank makes a charge-off or account-specific provision resulting from a significant perceived decline in credit quality subsequent to the bank taking on the exposure.<br>(3) The bank sells the credit obligation at a material credit-related economic loss.<br>(4) The bank consents to a distressed restructuring of the credit obligation where this is likely to result in a diminished financial obligation caused by the material forgiveness, or postponement, of principal, interest or (where relevant) fees.<br>(5) The bank has filed for the obligor's bankruptcy or a similar order in respect of the obligor's credit obligation to the banking group.<br>(6) The obligor has sought or has been placed in bankruptcy or similar protection where this would avoid or delay repayment of the credit obligation to the banking group.<br>This definition of default is the same as that published by the Basel Committee on Banking Supervision in its previous Basel III and Basel II Frameworks. |
| Default (Moody's) | A default 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). For details, please refer to Moody's Rating Symbols and Definitions (https://www.moodys.com/research/Moodys-Rating-Symbols-and-Definitions--PBC_79004). |
| Default In Work-Out (Basel) | A default (Basel) still in the work-out process. |
| Default In Work-Out (Moody's) | A default (Moody's) still in the work-out process. |
| Distressed Sale (Basel) | A default (Basel) for which a recovery has been realized following a distressed sale of a defaulted loan participation. |
| Distressed Sale (Moody's) | A default (Moody's) for which a recovery has been realized following a distressed sale of a defaulted loan participation. |
| Emergence From Default | For a loan that has defaulted, emergence from default is deemed to occur following any of the events set out below:<br>» Repayment of overdue interest<br>» Restructuring with no subsequent default<br>» Restructuring with lender being taken out of the deal – for example, by repayment of the defaulted loan with no participation in a restructured debt facility<br>» Material restructuring<br>» Liquidation |

| | |
|---|---|
| EEA | The European Economic Area (EEA) is the area in which the agreement on the EEA provides for the free movement of persons, good, services and capital within the European Single Market. The EEA includes the 27 member countries of the European Union and Norway, Iceland and Liechtenstein. The United Kingdom withdrew from the European Union on 31 January 2020. In this report the UK is still included in our EEA subset because it was still a member at 31 December 2018. For additional information and a list of all EU member states, please see: http://www.efta.int/eea and https://europa.eu/european-union/about-eu/countries_en |
| EEA/OECD | Projects located in countries within the EEA or OECD regions may qualify for lower regulatory capital under Solvency II, the European regulatory regime for insurers. |
| EMDE-A | Our EMDE-A subset comprises projects located in countries that were classified by the World Bank Group as non-high-income, on average, over the period 1995-2018 but excluding certain US dependent territories. The subset EMDE-A includes project finance bank loans in the following countries: Algeria, Angola, Argentina, Armenia, Azerbaijan, Bangladesh, Benin, Bolivia, Brazil, Bulgaria, Cabo Verde, Cameroon, Chad, Chile, China, Colombia, Costa Rica, Croatia, Czech Republic, Democratic Republic of Congo, Djibouti, Dominican Republic, Ecuador, Egypt, El Salvador, Equatorial Guinea, Fiji, Gabon, Ghana, Guatemala, Guinea, Honduras, Hungary, India, Indonesia, Iran, Ivory Coast, Jamaica, Jordan, Kazakhstan, Kenya, Lao PDR, Lebanon, Liberia, Lithuania, Macedonia, Madagascar, Malaysia, Mali, Mauritania, Mauritius, Mexico, Moldova, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Niger, Nigeria, Pakistan, Papua New Guinea, Peru, Philippines, Poland, Romania, Russia, Senegal, Serbia, Slovakia, South Africa, Sri Lanka, Tanzania, Thailand, Timor-Leste, Tunisia, Turkey, Uganda, Ukraine, Uzbekistan, Venezuela, Vietnam, Yemen, Zambia, Zimbabwe. |
| EMDE-B | The EMDE-B subset consists of all countries included in subset EMDE-A but excludes those countries that are located in the EEA or are OECD countries (i.e. Bulgaria, Chile, Croatia, Czech Republic, Hungary, Lithuania, Mexico, Poland, Romania, Slovakia, Turkey). |
| Green Bond Principles | The Green Bond Principles were published by the International Capital Markets Association (ICMA) (https://www.icmagroup.org/green-social-and-sustainability-bonds/green-bond-principles-gbp/). The Climate Bond Standard (https://www.climatebonds.net/standard) by the Climate Bonds Initiative provides sector-specific eligibility criteria for assets and projects that can be used for Climate Bonds and Green Bonds. Climate Bonds Initiative data are widely used in the market and include detailed information on green bond transactions across the globe.<br><br>The ICMA has also released Social Bond Principles and Sustainability Bond Guidelines. |
| Marginal Default Rate | The marginal default rate (hazard rate) is the ratio of the number of project defaults in a specific period divided by the number of projects exposed to the risk of default at the beginning of that period. For the purposes of this study, marginal default rates have been calculated on a monthly basis. |
| Moody's Default & Recovery Analytics Database | Moody's proprietary database, which contains information on nearly 5,700 defaulted loans and bonds taken from nearly 1,200 non-financial US corporations that initially defaulted since 1987. Please see Moody's Default & Recovery Analytics (https://www.moodys.com/Pages/Default-and-Recovery-Analytics.aspx). |
| OECD | The OECD currently has 36 member countries:<br><br>Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Latvia, Luxembourg, Mexico, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovakia, Slovenia, Spain, Sweden, Switzerland, Turkey, the United Kingdom, and the United States. Latvia joined the OECD as its 35th member on 1 July 2016 and Lithuania joined the OECD on 1 July 2018. |
| Project Finance | We reproduce below the Basel definition of project finance:<br><br>"Definition of corporate exposure<br><br>30.07 In general, a corporate exposure is defined as a debt obligation of a corporation, partnership, or proprietorship. Banks are permitted to distinguish separately exposures to small or medium-sized entities (SMEs), as defined in CRE31.9.<br>30.08 Within the corporate asset class, five sub-classes of specialised lending (SL) are identified.<br><br>Such lending possesses all the following characteristics, either in legal form or economic substance:<br><br>(1) The exposure is typically to an entity (often a special purpose entity, or SPE) which was created specifically to finance and/or operate physical assets;<br>(2) The borrowing entity has little or no other material assets or activities, and therefore little or no independent capacity to repay the obligation, apart from the income that it receives from the asset(s) being financed;<br><br>(3) The terms of the obligation give the lender a substantial degree of control over the asset(s) and the income that it generates; and<br>(4) As a result of the preceding factors, the primary source of repayment of the obligation is the income generated by the asset(s), rather than the independent capacity of a broader commercial enterprise.<br>The five sub-classes of SL are project finance (PF), object finance (OF), commodities finance (CF), income-producing real estate (IPRE), and high-volatility commercial real estate (HVCRE). Each of these sub-classes is defined below. |

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| | Project finance<br><br>30.10 PF is a method of funding in which the lender looks primarily to the revenues generated by a single project, both as the source of repayment and as security for the exposure. This type of financing is usually for large, complex and expensive installations that might include, for example, power plants, chemical processing plants, mines, transportation infrastructure, environment, and telecommunications infrastructure. Project finance may take the form of financing of the construction of a new capital installation, or refinancing of an existing installation, with or without improvements.<br><br>30.11 In such transactions, the lender is usually paid solely or almost exclusively out of the money generated by the contracts for the facility's output, such as the electricity sold by a power plant. The borrower is usually an SPE that is not permitted to perform any function other than developing, owning, and operating the installation. The consequence is that repayment depends primarily on the project's cash flow and on the collateral value of the project's assets. In contrast, if repayment of the exposure depends primarily on a well-established, diversified, credit-worthy, contractually obligated end user for repayment, it is considered a secured exposure to that end-user."<br><br>The Basel definition of project finance is the same as that previously published by the Basel Committee on Banking Supervision. |
| PPP | A public sector procurement structured as a public-private partnership. There exists no standard definition of what constitutes a PPP. A PPP is often defined as a long-term contractual agreement between a public sector governmental entity and a private developer to design, build, finance, operate and/or maintain an infrastructure asset for a specific period. The classification of a project as a PPP project in this addendum is based on its classification by the Data Consortium and involves some subjectivity. PPP projects are often referred to as P3 projects. |
| March 2020 study data set | The aggregated data set for the study, based on data provided by the Data Consortium. The study data set includes 8,583 projects, which account for 67.1% of all project finance bank loans originated globally during a period from 1 January 1983 to 31 December 2018. |
| Ultimate Recovery (Basel) | A default (Basel) for which recoveries have been realized following emergence from default, as defined above. |
| Ultimate Recovery (Moody's) | A default (Moody's) for which recoveries have been realized following emergence from default, as defined above. |
| World Bank Group Country Classification | For the fiscal year 2020, the World Bank Group defines low-income economies as those with a gross national income (GNI) per capita of $1,025 or less in 2018; lower-middle-income economies as those with GNI per capita between $1,026 and $3,995; upper-middle-income economies are those with a GNI per capita between $3,996 and $12,375; high-income economies are those with a GNI per capita of $12,376 or more. For a full definition of World Bank Group Country Classification and list of countries by category, see https://datahelpdesk.worldbank.org/knowledgebase/articles/906519-world-bank-country-and-lending-groups. |
| Africa | Africa includes projects in Algeria, Angola, Benin, Botswana, Burkina Faso, Cabo Verde, Cameroon, Chad, Democratic Republic of the Congo, Côte d'Ivoire, Djibouti, Egypt, Equatorial Guinea, Ethiopia, Gabon, Ghana, Guinea, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Morocco, Mozambique, Namibia, Niger, Nigeria, Senegal, Sierra Leone, South Africa, Tanzania, Tunisia, Uganda, Zambia, Zimbabwe |
| Asia | Asia includes projects in Bangladesh, Brunei, China, Hong Kong, India, Indonesia, Japan, Kazakhstan, Lao PDR, Macau, Malaysia, Mongolia, Myanmar, Pakistan, Papua New Guinea, Philippines, Singapore, South Korea, Sri Lanka, Taiwan, Thailand, East Timor, Turkmenistan, Uzbekistan, and Vietnam |
| Eastern Europe | Eastern Europe includes projects in Bulgaria, Croatia, Czech Republic, Estonia, Hungary, Lithuania, Macedonia, Moldova, Poland, Romania, Russia, Serbia, Slovakia, Slovenia, and Ukraine |
| Latin America | Latin America includes projects in Argentina, Bahamas, Bolivia, Brazil, Cayman Islands, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Jamaica, Panama, Peru, Puerto Rico, Trinidad and Tobago, Turks and Caicos Islands, Uruguay, Venezuela, and the Virgin Islands |
| Middle East | Middle East includes projects in Armenia, Azerbaijan, Bahrain, Iran, Israel, Jordan, Kuwait, Lebanon, Oman, Qatar, Saudi Arabia, Syria, Tunisia, Turkey, United Arab Emirates, and Yemen |
| North America | North America includes projects in Bermuda, Canada, the United States of America, and Mexico |
| Oceania | Oceania includes projects in Australia, Fiji, Guam, Marshall Islands, New Zealand, and the Solomon Islands |
| Western Europe | Western Europe includes projects in Austria, Belgium, Cyprus, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Isle of Man, Italy, Luxembourg, Malta, the Netherlands, Norway, Portugal, Spain, Switzerland, Sweden, and the United Kingdom |

*Source: Moody's Investors Service*

## About the Moody's Analytics Data Alliance

The Moody's Analytics Data Alliance is one of the world's largest and most comprehensive data consortia covering Commercial and Industrial, Commercial Real Estate, Project and Infrastructure Finance, Asset Finance and Agriculture. Built in partnership with over 120 leading global financial institutions, the Data Alliance database contains private firm financial statement, loan, default and other key financial information. For more information please send an email to DataAlliance@moodys.com or to Kevin Kelhoffer, Moody's Analytics, Director – Enterprise Risk Solutions, (Kevin.Kelhoffer@moodys.com).

The data presented in this report is sourced from the Moody's Analytics Data Alliance. All analytics and statistics are compiled by Moody's Analytics; all market and industry commentary has been prepared by Moody's Investors Service.

## Moody's related publications

**Default Research:**

**Default Research — Moody's Analytics Project Finance Data Consortium**

» Default and recovery rates for project finance bank loans, 1983-2018, March 2020

» Default and recovery rates for project finance bank loans, 1983-2018 (slides), March 2020

» Default and recovery rates for project finance bank loans, 1983-2016: Green projects demonstrate lower default risk, September 2018

» Default and recovery rates for project finance bank loans, 1983-2016: Advanced economies vs emerging markets, September 2018

**Default Research — Moody's-rated Infrastructure Debt Securities**

» Infrastructure & Project Finance Infrastructure default and recovery rates, 1983-2018, August 2019

**Moody's-rated Corporates**

» Default Trends – Global: July 2020 Default Report, August 2020

» Recoveries in a pandemic-driven default cycle, May 2020

» Compendium of 2019 Corporate Defaults, May 2020

» Annual default study: Defaults will edge higher in 2020, January 2020

» Annual default study: Defaults will rise modestly in 2019 amid higher volatility, February 2019

**Other research**

» Growing interest in project finance underlines it recovery characteristics, March 2020

To access any of these reports, click on the entry above. Note that these references are current as of the date of publication of this report and that more recent reports may be available. All research may not be available to all clients.

## Endnotes

1 See Basel Framework published by the Basel Committee on Banking Supervision. The Basel III reforms have now been integrated into the consolidated Basel Framework.

2 Please see Moody's Sector In-Depth report, "**Annual default study: Defaults will rise modestly in 2019 amid higher volatility, February 2019**," Exhibit 43 and 44.

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