

Package ‘r2dii.analysis’

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Title Measure Climate Scenario Alignment of Corporate Loans

Version 0.2.0

Description These tools help you to assess if a corporate lending portfolio aligns with climate goals. They summarize key climate indicators attributed to the portfolio (e.g. production, emission factors), and calculate alignment targets based on climate scenarios. They implement in R the last step of the free software 'PACTA' (Paris Agreement Capital Transition Assessment; <https://2degrees-investing.org/>). Financial institutions use 'PACTA' to study how their capital allocation decisions align with climate change mitigation goals.

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URL <https://github.com/2DegreesInvesting/r2dii.analysis>,
<https://2degreesinvesting.github.io/r2dii.analysis/>

BugReports <https://github.com/2DegreesInvesting/r2dii.analysis/issues>

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join_abcd_scenario	<i>Join a data-loanbook object to the abcd and scenario</i>
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Description

join_abcd_scenario() is a simple wrapper of several calls to `dplyr::join_*`(), forming the master dataset to be used in later steps of the analysis.

Usage

```
join_abcd_scenario(
  data,
  abcd,
  scenario,
  region_isos = r2dii.data::region_isos,
  add_green_technologies = FALSE
)
```

Arguments

data	A data frame like the output of <code>r2dii.match::prioritize</code> .
abcd	An asset level data frame like <code>r2dii.data::abcd_demo</code> .
scenario	A scenario data frame like <code>r2dii.data::scenario_demo_2020</code> .
region_isos	A data frame like <code>r2dii.data::region_isos</code> (default).
add_green_technologies	Logical vector of length 1. FALSE defaults to outputting only technologies that are present in both data and abcd. Set to FALSE to add rows of all possible green technologies (with 0 production).

Value

Returns a fully joined data frame, linking portfolio, abcd and scenario.

See Also

Other utility functions: `summarize_weighted_production()`

Examples

```

installed <- requireNamespace("r2dii.data", quietly = TRUE) &&
  requireNamespace("r2dii.match", versionCheck = "0.1.0", quietly = TRUE) &&
  packageVersion("r2dii.match") >= "0.1.0"

if (installed) {
  library(r2dii.data)
  library(r2dii.match)

  valid_matches <- match_name(loanbook_demo, abcd_demo) %>%
    # WARNING: Remember to validate matches (see `?prioritize`)
    prioritize()

  valid_matches %>%
    join_abcd_scenario(
      abcd = abcd_demo,
      scenario = scenario_demo_2020,
      region_isos = region_isos_demo
    )
}

```

summarize_weighted_production

Summaries based on the weight of each loan per sector per year

Description

Based on on the weight of each loan per sector per year, `summarize_weighted_production()` and `summarize_weighted_percent_change()` summarize the production and percent-change, respectively.

Usage

```
summarize_weighted_production(data, ..., use_credit_limit = FALSE)
```

```
summarize_weighted_percent_change(data, ..., use_credit_limit = FALSE)
```

Arguments

<code>data</code>	A data frame like the output of <code>join_abcd_scenario()</code> .
<code>...</code>	Variables to group by.
<code>use_credit_limit</code>	Logical vector of length 1. FALSE defaults to using the column <code>loan_size_outstanding</code> . Set to TRUE to instead use the column <code>loan_size_credit_limit</code> .

Value

A tibble with the same groups as the input (if any) and columns: sector, technology, and year; and weighted_production or weighted_production for summarize_weighted_production() and summarize_weighted_percent_change(), respectively.

Warning

The percent-change analysis excludes companies with 0 production. percent-change is undefined for companies that have no initial production; including such companies would cause percent-change percentage to be infinite, which is wrong.

See Also

[join_abcd_scenario\(\)](#).

Other utility functions: [join_abcd_scenario\(\)](#)

Examples

```
installed <- requireNamespace("r2dii.data", quietly = TRUE) &&
  requireNamespace("r2dii.match", quietly = TRUE) &&
  packageVersion("r2dii.match") >= "0.1.0"

if (installed) {
  library(r2dii.data)
  library(r2dii.match)

  loanbook <- head(loanbook_demo, 150)
  abcd <- head(abcd_demo, 100)
  master <- loanbook %>%
    match_name(abcd) %>%
    prioritize() %>%
    join_abcd_scenario(
      abcd = abcd,
      scenario = scenario_demo_2020,
      region_isos = region_isos_demo
    )

  summarize_weighted_production(master)

  summarize_weighted_production(master, use_credit_limit = TRUE)

  summarize_weighted_percent_change(master)

  summarize_weighted_percent_change(master, use_credit_limit = TRUE)
}
```

target_market_share *Add targets for production, using the market share approach*

Description

This function calculates the portfolio-level production targets, as calculated using the market share approach applied to each relevant climate production forecast.

Usage

```
target_market_share(
  data,
  abcd,
  scenario,
  region_isos = r2dii.data::region_isos,
  use_credit_limit = FALSE,
  by_company = FALSE,
  weight_production = TRUE,
  ald = deprecated()
)
```

Arguments

data	A "data.frame" like the output of <code>r2dii.match::prioritize</code> .
abcd	An asset level data frame like <code>r2dii.data::abcd_demo</code> .
scenario	A scenario data frame like <code>r2dii.data::scenario_demo_2020</code> .
region_isos	A data frame like <code>r2dii.data::region_isos</code> (default).
use_credit_limit	Logical vector of length 1. FALSE defaults to using the column <code>loan_size_outstanding</code> . Set to TRUE to use the column <code>loan_size_credit_limit</code> instead.
by_company	Logical vector of length 1. FALSE defaults to outputting <code>production_value</code> at the portfolio-level. Set to TRUE to output <code>production_value</code> at the company-level.
weight_production	Logical vector of length 1. TRUE defaults to outputting production, weighted by relative loan-size. Set to FALSE to output the unweighted production values.
ald	[Superseded] ald has been superseded by abcd.

Value

A tibble including the summarized columns `metric`, `production`, `technology_share`, `percentage_of_initial_production` and `scope`. If `by_company = TRUE`, the output will also have the column `name_abcd`.

Handling grouped data

This function ignores existing groups and outputs ungrouped data.

See Also

Other functions to calculate scenario targets: [target_sda\(\)](#)

Examples

```

installed <- requireNamespace("r2dii.data", quietly = TRUE) &&
  requireNamespace("r2dii.match", quietly = TRUE) &&
  packageVersion("r2dii.match") >= "0.1.0"

if (installed) {
  library(r2dii.data)
  library(r2dii.match)

  loanbook <- head(loanbook_demo, 100)
  abcd <- head(abcd_demo, 100)

  matched <- loanbook %>%
    match_name(abcd) %>%
    prioritize()

  # Calculate targets at portfolio level
  matched %>%
    target_market_share(
      abcd = abcd,
      scenario = scenario_demo_2020,
      region_isos = region_isos_demo
    )

  # Calculate targets at company level
  matched %>%
    target_market_share(
      abcd = abcd,
      scenario = scenario_demo_2020,
      region_isos = region_isos_demo,
      by_company = TRUE
    )

  matched %>%
    target_market_share(
      abcd = abcd,
      scenario = scenario_demo_2020,
      region_isos = region_isos_demo,
      # Calculate unweighted targets
      weight_production = FALSE
    )
}

```

target_sda

Add targets for CO2 emissions per unit production at the portfolio level, using the SDA approach

Description

This function calculates targets of CO2 emissions per unit production at the portfolio-level, otherwise referred to as "emissions factors". It uses the [sectoral-decarbonization approach \(SDA\)](#) to calculate these targets.

Usage

```
target_sda(  
  data,  
  abcd,  
  co2_intensity_scenario,  
  use_credit_limit = FALSE,  
  by_company = FALSE,  
  region_isos = r2dii.data::region_isos,  
  ald = deprecated()  
)
```

Arguments

data	A dataframe like the output of <code>r2dii.match::prioritize()</code> .
abcd	An asset-level data frame like <code>r2dii.data::abcd_demo</code> .
co2_intensity_scenario	A scenario data frame like <code>r2dii.data::co2_intensity_scenario_demo</code> .
use_credit_limit	Logical vector of length 1. FALSE defaults to using the column <code>loan_size_outstanding</code> . Set to TRUE to instead use the column <code>loan_size_credit_limit</code> .
by_company	Logical vector of length 1. FALSE defaults to outputting <code>weighted_production_value</code> at the portfolio-level. Set to TRUE to output <code>weighted_production_value</code> at the company-level.
region_isos	A data frame like <code>r2dii.data::region_isos</code> (default).
ald	[Superseded] ald has been superseded by abcd.

Value

A tibble including the summarized columns `emission_factor_metric` and `emission_factor_value`. If `by_company = TRUE`, the output will also have the column `name_abcd`.

Handling grouped data

This function ignores existing groups and outputs ungrouped data.

See Also

Other functions to calculate scenario targets: `target_market_share()`

Examples

```
installed <- requireNamespace("r2dii.match", quietly = TRUE) &&
  requireNamespace("r2dii.data", quietly = TRUE) &&
  packageVersion("r2dii.match") >= "0.1.0"

if (installed) {
  library(r2dii.match)
  library(r2dii.data)

  loanbook <- head(loanbook_demo, 150)
  abcd <- head(abcd_demo, 100)

  matched <- loanbook %>%
    match_name(abcd) %>%
    prioritize()

  # Calculate targets at portfolio level
  matched %>%
    target_sda(
      abcd = abcd,
      co2_intensity_scenario = co2_intensity_scenario_demo,
      region_isos = region_isos_demo
    )

  # Calculate targets at company level
  matched %>%
    target_sda(
      abcd = abcd,
      co2_intensity_scenario = co2_intensity_scenario_demo,
      region_isos = region_isos_demo,
      by_company = TRUE
    )
}
```


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