Package 'r2dii.analysis'

Title Measure Climate Scenario Alignment of Corporate Loans

Version 0.4.0

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://www.transitionmonitor.com/>). 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/RMI-PACTA/r2dii.analysis>,
<https://rmi-pacta.github.io/r2dii.analysis/>

BugReports <https://github.com/RMI-PACTA/r2dii.analysis/issues>

Depends R (>= 3.4)

Imports dplyr (>= 0.8.5), glue, lifecycle, magrittr, r2dii.data (>=
0.4.0), rlang (>= 0.1.2), tidyr, tidyselect, zoo

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Author Alex Axthelm [aut, cre] (<https://orcid.org/0000-0001-8579-8565>),
Jackson Hoffart [aut, ctr] (<https://orcid.org/0000-0002-8600-5042>),
Mauro Lepore [aut, ctr] (<https://orcid.org/0000-0002-1986-7988>),
Klaus Hogedorn [aut],
Nicky Halterman [aut],
Rocky Mountain Institute [cph, fnd]

Maintainer Alex Axthelm <aaxthelm@rmi.org>

Repository CRAN

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R **topics documented:**

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join_abcd_scenario	*Join a data-loanbook object to the abcd and scenario*

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 r2dii.match::prioritize.
abcd	An asset level data frame like r2dii.data::abcd_demo.
scenario	A scenario data frame like r2dii.data::scenario_demo_2020.
region_isos	A data frame like r2dii.data::region_isos (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

```
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
  )
```

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summarize_weighted_production

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

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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

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

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

```
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
    ) %>%
  dplyr::filter(production != 0)

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)
```

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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,
  increasing_or_decreasing = r2dii.data::increasing_or_decreasing
)
```

Arguments

data	A "data.frame" like the output of r2dii.match::prioritize.
abcd	An asset level data frame like r2dii.data::abcd_demo.
scenario	A scenario data frame like r2dii.data::scenario_demo_2020.
region_isos	A data frame like r2dii.data::region_isos (default).
use_credit_limit	Logical vector of length 1. FALSE defaults to using the column loan_size_outstanding. Set to TRUE to use the column loan_size_credit_limit instead.
by_company	Logical vector of length 1. FALSE defaults to outputting production_value at the portfolio-level. Set to TRUE to output production_value 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.
increasing_or_decreasing	A data frame like r2dii.data::increasing_or_decreasing.

Value

A tibble including the summarized columns metric, production, technology_share, percentage_of_initial_producti 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

```
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
    )
```

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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, oth-
erwise 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
)
```

Arguments

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

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

```
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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