Package 'indexDesignWindows'

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Type Package

Title Replication Package: Redesigning Historical Windows in Index-Based Insurance

Version 0.0.0.9000

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Description Replication package for a study evaluating alternative historical window designs used to construct the Pasture, Rangeland, and Forage (PRF) rainfall index under the U.S. Federal Crop Insurance Program (FCIP). The package systematically compares index designs based on varying lengths of historical climate data to assess implications for index stability, spatial equity, indemnity accuracy, and policy performance. It provides reproducible workflows, pre-processed outputs, and visualization tools to support robustness analysis of index-based insurance products in both U.S. and international contexts.

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URL https://github.com/ftsiboe/indexDesignWindows

BugReports https://github.com/ftsiboe/indexDesignWindows/issues

Encoding UTF-8

Roxygen list(markdown = TRUE)

RoxygenNote 7.3.3

VignetteBuilder knitr

Depends R (>= 4.1.0)

Imports data.table, ggplot2

Remotes github::ftsiboe/rfcipDemand

Suggests dplyr, tidyr, knitr, rmarkdown, withr, stats, rfcipDemand, piggyback, testthat (>= 3.0.0)

LazyData true

Cite-us If you find it useful, please consider staring the repository and citing the following studies
- Tsiboe, F. and Turner, D. (2025). ``Incorporating buy-up price loss coverage into the United States farm safety net." Applied Economic Perspectives and Policy.
- Tsiboe, F., et al. (2025). ``Risk reduction impacts of crop insurance in the United States." Applied Economic Perspectives and Policy.
- Gaku, S. and Tsiboe, F. (2024). Evaluation of alternative farm safety net program combination strategies. Agricultural Finance Review.

Contents

`ers_theme` *ERS Theme*

Description

ERS Theme

Usage

```
ers_theme()
```

Source

coppied from https://github.com/USDA-REE-ERS/MTED-Theme on 08/01/2025

Examples

```
ggplot2::ggplot() + ers_theme()
```

`get_price_indices` *Build a price-received deflator (PPIPR) series relative to* `current_year`

Description

Constructs a table used to deflate nominal FCIP monetary amounts to a common base year. Returns two columns, `commodity_year` and `PPIPR`, where `PPIPR` equals the year's price-received index divided by the index in `current_year` (so `PPIPR(current_year) == 1`).

Usage

```
get_price_indices(current_year = NULL)
```

Arguments

`current_year`	Integer scalar. The base year used for normalization. The returned `PPIPR` equals 1 for this year.

Details

Data sources (from `rfcipDemand`):

- `nassSurveyPriceRecivedIndex` (annual; expects `commodity_year`, `index_for_price_recived`).
- `nassAgPriceMonthlyIndex` (monthly U.S. agricultural price index; expects `year`, `comm`, `index`).

Synthesizing the current year (if missing in the annual table):

- Compute the arithmetic mean of the monthly index where `comm == "Agricultural"` for both `current_year` and `current_year - 1`.
- Multiply last year's annual `index_for_price_recived` by the ratio `mean_monthly(current_year) / mean_monthly(current_year - 1)` to derive the current-year annual index.
- Append this row with `data_source = "calculated"`.

Normalization:

- Let the denominator be the (mean) `index_for_price_recived` among rows with `commodity_year == current_year` (provides stability if duplicates exist).
- Define `PPIPR = index_for_price_recived / denominator`.

Output shape:

- Returns only `commodity_year` and `PPIPR`, sorted ascending by `commodity_year`.
- If the input annual table contains multiple rows per year, duplicates are preserved in the output (each with its own `PPIPR`). Aggregate if you require strictly one row per year (see Notes).

Value

A `data.table` with two columns:

- `commodity_year` - integer year.
- `PPIPR` - numeric deflator equal to the year's price-received index divided by the `current_year` index.

Assumptions & Notes

- Assumes both reference datasets from **rfcipDemand** are available with the specified columns (including the source's spelling `index_for_price_recived`).
- Monthly means are computed with `na.rm = TRUE`.
- If you need one row per year, post-aggregate: `dt[, .(PPIPR = mean(PPIPR, na.rm = TRUE)), by = commodity_year]`.

`setup_environment` *Setup Project Environment*

Description

Initializes the working environment for a project by creating required directories, setting useful global options, and fixing the random seed.

Usage

```
setup_environment(
  year_beg = 2001,
  year_end = as.numeric(format(Sys.Date(), "%Y")),
  seed = 1980632,
  project_name,
 local_directories = list(file.path("data-raw", "output"), file.path("data-raw",
    "scripts"), file.path("data")),
  fastscratch_root = NULL,
  fastscratch_directories = NULL
)
```

Arguments

`year_beg`	Integer. Beginning year of the analysis (default: 2001).
`year_end`	Integer. Ending year of the analysis (default: current system year).
`seed`	Integer. Random seed for reproducibility (default: 1980632).
`project_name`	Character. Project name (required). Used to build fast-scratch directory paths.
`local_directories`	List of project-local directories to create (default: `list("data-raw/output", "data-raw/scripts", "data")`).
`fastscratch_root`	Optional character. Root directory for fast-scratch files. If `NULL`, it is set automatically: • Windows: `"C:/fastscratch"` • Linux/macOS: `"/fastscratch/<username>"`
`fastscratch_directories`	List of fast-scratch subdirectories (relative to `<fastscratch_root>/<project_name>`) to create. If `NULL`, no fast-scratch subdirectories are created and `wd` is returned as an empty list.

Details

The function ensures the requested directories exist, creating them if necessary. Directory keys in the returned `wd` list are the basenames of the provided `fastscratch_directories`.

It also sets the following options:

- `options(scipen = 999)` (turns off scientific notation)
- `options(future.globals.maxSize = 8 * 1024^3)` (~8 GiB)
- `options(dplyr.summarise.inform = FALSE)` (quiet **dplyr**)

Finally, the random number generator is seeded with the provided `seed`.

Value

A list with:

wd Named list of created fast-scratch directories. Empty if `fastscratch_directories = NULL`.

year_beg Starting year (integer).

year_end Ending year (integer).

seed Seed value used for RNG.

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