Package 'fcipSupplementalLab'

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Type Package

Title Research Framework for Supplemental Crop Insurance in the FCIP

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Description Provides a research framework for analyzing supplemental crop insurance products in the United States Federal Crop Insurance Program (FCIP). The package supports reproducible workflows to evaluate adoption and demand, actuarial performance and program soundness, fiscal exposure, risk reduction and income transfer, and basis risk and coverage quality. Functions emphasize transparent data preparation, diagnostic summaries, and modular analysis components suitable for reports and policy briefs.

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

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

Encoding UTF-8

Roxygen list(markdown = TRUE)

RoxygenNote 7.3.3

VignetteBuilder knitr

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Imports data.table, rfcip, stringr, urbnmapr, matrixStats, ggplot2

Remotes github::dylan-turner25/rfcip, github::UrbanInstitute/urbnmapr, github::dylan-turner25/rfsa

Suggests dplyr, tidyr, knitr, rmarkdown, mockery, withr, testthat (>= 3.0.0), piggyback, purrr, readr, devtools

LazyData true

Contents

`aggregate_expected_outcomes` *Aggregate and winsorize expected outcomes (year-level)*

Description

Loads all per-task expected outcome files for a given year, aggregates them, winsorizes key relative metrics within groups (5th-95th percentiles), and saves a single cleaned file.

Usage

```
aggregate_expected_outcomes(
  year,
  expected_directory = NULL,
  output_directory = NULL,
  study_environment,
 agent_identifiers = c("commodity_year", "state_code", "county_code", "type_code"),
  disaggregate = NULL
)
```

Arguments

`year`	Integer. Year to aggregate.
`expected_directory`	Character or NULL. Directory containing per-task `expected_*.rds` files for the year. If NULL, uses `file.path(study_environment$wd$dir_expected, year)`.
`output_directory`	Character or NULL. Directory to write the aggregated file. If NULL, uses `study_environment$wd$dir_expected`.

`study_environment`
: List. Must provide `$wd$dir_expected` (and is used to resolve defaults when directories are NULL).

`agent_identifiers`
: Character vector. Grouping keys used for by-group winsorization (default: `c("commodity_year","s`

`disaggregate`
: Character or NULL. Optional extra grouping column (e.g., `"combination"`). If provided but missing, it is created as `"ALL"`.

Details

Reads all `.rds` files under `expected_directory`, binds them, computes 5th and 95th percentiles for `Relmean`, `Relsd`, `Relcv`, `Rellapv`, `Rellrpv`, `Relnlapv`, `Relnlrpv`, `Relvar` within each group, caps values to that range, and writes `expected_<year>.rds` to `output_directory`.

Value

Invisibly returns the path to the saved file.

`build_agent_simulation_data` *Build agent simulation panel*

Description

Read cleaned agent-level simulation data for a crop year, unnest per-draw outcomes, filter to the requested draw(s), compute county-level expected yields, and add per-row revenue.

Usage

```
build_agent_simulation_data(
  year,
  sim,
  agents_directory = "data/cleaned_agents_data"
)
```

Arguments

`year`
: Integer. Crop year.

`sim`
: Integer vector. Draw number(s) to keep.

`agents_directory`
: Character. Directory containing cleaned agent data. Default: `"data/cleaned_agents_data"`.

Details

The function:

1. Loads `cleaned_agents_data_<year>.rds` from `agents_directory`.
2. Unnests draw pools: number, farm yield/price, and county yield/price.
3. Filters to `sim` (matching `rma_draw_number`).
4. Renames simulated fields to canonical names and floors negative county yields at zero.
5. Computes a planted-acre-weighted `expected_county_yield`.
6. Computes row-level `revenue` = `actual_farm_yield` * `actual_price` * `planted_acres`.

Value

A data.table containing all original columns plus:

- `expected_county_yield`
- `final_county_yield`
- `harvest_price`
- `revenue`

`build_supplemental_offering_and_adoption` *Build panel of supplemental insurance availability (offering) and adoption (acres)*

Description

Builds a county-year-commodity panel that combines: (i) availability flags for APH, SCO, and ECO (ECO90/ECO95), sourced from the RMA ADM dataset `A00030_InsuranceOffer`, and (ii) adoption/acreage measures computed from cleaned RMA SOB/TPU records.

Usage

```
build_supplemental_offering_and_adoption(sob)
```

Arguments

`sob`	data.frame or data.table. Cleaned SOB/TPU-like micro data containing at least `commodity_year`, `state_code`, `county_code`, `commodity_code`, `insured_acres`, and indicator columns `sco`, `eco90`, `eco95` (typically 0/1).

Details

The function aggregates SOB/TPU records to county-year-commodity totals, then constructs a full county shell using `urbnmapr` and merges in ADM availability and SOB/TPU adoption. ECO availability is only populated for years >= 2021. Missing availability flags and acreage measures are replaced with 0.

Adoption acres (SOB/TPU): `sco`, `eco90`, and `eco95` are converted to adopted acres by multiplying each indicator by `insured_acres`, then summing within `(commodity_year, state_code, county_code, commodity_` for years >= 2015.

Availability (ADM): Availability is derived from `A00030_InsuranceOffer` by insurance plan code:

- APH/Yield plan family: 1, 2, 3, 90 -> `avail_aph`
- SCO endorsements: 31–33 -> `avail_sco`
- ECO endorsements: 87–89 -> `avail_eco90` and `avail_eco95` (years >= 2021 only)

Availability is aggregated to binary flags (max).

County shell: The output includes all U.S. counties (from `urbnmapr`) crossed with all `(commodity_year, commodity_c` pairs present in the ADM availability table. Counties with no offering or no adoption for a given key will have zeros.

Value

A data.table with one row per (commodity_year, state_code, county_code, commodity_code) containing:

- Keys: commodity_year, state_code, county_code, commodity_code
- Convenience: county_fips (character, 5-digit FIPS)
- Availability flags: avail_aph, avail_sco, avail_eco90, avail_eco95 (0/1)
- Adoption acres: insured_acres, sco, eco90, eco95

---

clean_eco_share_by_insurance_plan

ECO share by insurance plan

Description

Computes Enhanced Coverage Option (ECO) **shares of insured acres** for base plans (1=YP, 2=RP, 3=RP-HPE), using ECO plan codes 87-89 mapped back to 1-3, and returns separate shares for ECO-90 and ECO-95.

Usage

```
clean_eco_share_by_insurance_plan(sob)
```

Arguments

sob	A data.table (or data.frame) of SOB records that already contain aggregated acre and dollar fields. Must include at least: insured_acres, endorsed_acres, insurance_plan_code, coverage_level_percent, commodity_year, state_code, county_code, commodity_code, type_code, practice_code.

Details

- Base data are summed for plans 1:3.
- ECO records are selected via plan codes 87:89, remapped to 1:3 (subtract 86), and coverage levels are labeled as "eco90" / "eco95" (using coverage_level_percent * 100).
- ECO shares are computed as eco_endorsed_acres / insured_acres by key.

Value

A data.table with unique rows by commodity_year, state_code, county_code, commodity_code, type_code, p and columns: eco90, eco95 (shares in [0,1]); missing combinations may be NA.

clean_rma_sco_and_eco_adm

Build SCO/ECO/Area ADM table for a given year (adds SCO88/SCO90)

Description

Downloads yearly ADM fragments from GitHub Releases for *Supplemental SCO*, *Supplemental ECO*, and *Area* plans, aggregates key parameters by common grouping keys, linearly interpolates SCO rates to 88% and 90% (using AYP and, for years >= 2021, ECO anchors), and returns the cleaned, stacked table.

Usage

```
clean_rma_sco_and_eco_adm(year)
```

Arguments

`year`	Integer. commodity year (e.g., 2022).

Value

A data.table containing original SCO/ECO/Area ADM rows plus synthesized **SCO88** (`insurance_plan_code + 10`) and **SCO90** (`insurance_plan_code + 20`) rows with non-invalid `base_rate`.

Note

Requires internet access. Missing plan files for a year are skipped silently.

clean_rma_sobtpu

Clean and aggregate RMA Summary of Business (SOB-TPU) data

Description

Retrieves RMA SOB-TPU records for requested years, combining **live** years (last 5 years, fetched via `rfcip::get_sob_data()`) with **stable** years (downloaded from a prebuilt `.rds` release), then filters, harmonizes insurance plan codes, coverage levels, and unit structure codes, and returns an analysis-ready `data.table` aggregated to common keys.

Usage

```
clean_rma_sobtpu(
  years = as.numeric(format(Sys.Date(), "%Y")) - 1,
  insurance_plan = NULL,
  acres_only = TRUE,
  addon_only = TRUE,
  harmonize_insurance_plan_code = TRUE,
  harmonize_coverage_level_percent = TRUE,
  harmonize_unit_structure_code = TRUE
)
```

Arguments

years	Integer vector of commodity years.
insurance_plan	Optional integer vector of harmonized plan codes to keep after harmonization (1=YP, 2=RP, 3=RP-HPE). If NULL, keep all.
acres_only	Logical; keep only acres-level records. Default TRUE.
addon_only	Logical; exclude CAT (coverage_type_code == "C"). Default TRUE.
harmonize_insurance_plan_code	Logical; recode plans to (1,2,3). Default TRUE.
harmonize_coverage_level_percent	Logical; normalize coverage levels to decimal in 0.50 to 0.95 at 0.05 steps. Default TRUE.
harmonize_unit_structure_code	Logical; recode unit structure to (OU, BU, and EU). Default TRUE.

Value

A data.table aggregated to the keys with columns: insured_acres, endorsed_acres, liability_amount, total_premium_amount, subsidy_amount, indemnity_amount.

---

clean_sco_share_by_coverage_level

SCO share by coverage level

Description

Computes the Supplemental Coverage Option (SCO) **share of insured acres** by coverage level for base plans (1=YP, 2=RP, 3=RP-HPE), using SCO plan codes 31-33 mapped back to 1-3.

Usage

```
clean_sco_share_by_coverage_level(sob)
```

Arguments

sob	A data.table (or data.frame) of SOB records that already contain aggregated acre and dollar fields. Must include at least: insured_acres, endorsed_acres, insurance_plan_code, coverage_level_percent, commodity_year, state_code, county_code, commodity_code, type_code, practice_code.

Details

- Base data are summed for plans 1:3.
- SCO records are selected via plan codes 31:33 and then remapped to 1:3 (subtract 30) to align with corresponding base plans.
- SCO share is computed as endorsed_acres / insured_acres by key and coverage level.

Value

A data.table with unique rows by commodity_year, state_code, county_code, commodity_code, type_code, p and column: sco (share in [0,1]).

clean_supplemental_plan_shares

Supplemental plan shares (SCO/ECO)

Description

Aggregates base plan acres/dollars and (optionally) merges in Supplemental Coverage Option (SCO) and Enhanced Coverage Option (ECO) shares for each key.

Usage

```
clean_supplemental_plan_shares(
  sob,
  get_sco_shares = TRUE,
  get_eco_shares = TRUE
)
```

Arguments

sob	A data.table or data.frame of SOB records. Expected columns: insured_acres, endorsed_acres, insurance_plan_code, coverage_level_percent, commodity_year, state_code, county_code, commodity_code, type_code, practice_code, unit_structure_code coverage_type_code, liability_amount, total_premium_amount, subsidy_amount, indemnity_amount.
get_sco_shares	Logical; if TRUE, merge SCO shares by coverage level.
get_eco_shares	Logical; if TRUE, merge ECO-90/95 shares by plan.

Details

Assumes base plans are harmonized to 1=YP, 2=RP, 3=RP-HPE, and coverage_level_percent is in decimals (e.g., 0.90, 0.95). Relies on helpers: clean_sco_share_by_coverage_level() and clean_eco_share_by_insurance_plan().

Value

A data.frame with aggregated acres/dollars and columns sco, eco90, eco95 (shares in [0,1] where available).

compute_base_policy_outcomes

Compute base-policy outcomes

Description

Vectorized **data.table** implementation of base-policy guarantees, acres/liability, premium pieces (total/subsidy/producer), and indemnity, plus a tidy column subset for downstream joins.

Usage

```
compute_base_policy_outcomes(cleaned_agents_data)
```

Arguments

`cleaned_agents_data`
: A `data.frame` or `data.table` with the required columns (see error message if any are missing).

Details

Requires a set of core inputs (e.g., yields, prices, coverages, acres) and returns the standard monetary outputs for each policy row. Price risk is handled via a `new_insurance_guarantee` that depends on plan code.

Value

A data.table with key fields and outputs: `insured_acres`, `liability`, `total_premium`, `subsidy_amount`, `producer_premium`, `indemnity`, `revenue`, and supporting fields such as `harvest_price`, `expected_county_yield`, `final_county_yield`, `new_insurance_guarantee`, `projected_price`.

`compute_expected_outcomes` *Compute expected outcomes and risk metrics from simulation outputs*

Description

Joins cleaned agent records to simulation files, then computes expected (mean/sd) revenues, downside-risk measures (loss-side residual moments), relative improvements with insurance, and insurance performance statistics. Writes a single `.rds` result file and returns its path (invisibly).

Usage

```
compute_expected_outcomes(
  year,
  task_id,
  agents_directory = "data/cleaned_agents_data",
  simulation_directory = NULL,
  output_directory = NULL,
  study_environment,
 agent_identifiers = c("commodity_year", "state_code", "county_code", "commodity_code",
    "type_code", "practice_code", "unit_structure_code", "insurance_plan_code",
    "coverage_level_percent", "insured_acres"),
  disaggregate = NULL
)
```

Arguments

`year` Integer (scalar). Analysis year (used to resolve input/output paths).

`task_id` Integer or integer vector. Pseudo-task partition(s) to keep; the function cycles a 1..500 index over agent rows and filters to these values.

`agents_directory`
: Character. Directory containing `cleaned_agents_data_<year>.rds`.

simulation_directory
: Character or NULL. Directory with simulation .rds files; default is file.path(study_environment$
year).

output_directory
: Character or NULL. Directory to write results; default is file.path(study_environmentwddir_ex
year).

study_environment
: List. Must include wd$dir_sim and wd$dir_expected if the corresponding directory arguments are NULL.

agent_identifiers
: Character vector. Columns that identify agent units and define aggregation groups (used for joins and by); default includes year, location, crop, unit structure, plan, coverage, and acres.

disaggregate
: Character or NULL. Optional extra column to disaggregate by (for example, "combination"). If provided but missing after the join, the column is created and set to "ALL".

Details

Pipeline

1. Load agent data and keep only agent_identifiers; coerce to data.table.
2. Assign a pseudo task (cycles 1..500), then filter to task_id.
3. Guardrails:
   - Stop if no simulation files are found.
   - Stop if the combined join yields zero rows.
   - Validate required numeric columns: revenue, indemnity, producer_premium, liability, total_premium, subsidy_amount.
   - Use safe_div() to avoid Inf/NaN on zero or non-finite denominators.
4. Compute revenues (floored at 0): Revenue and Revenue_Inc (= revenue + indemnity
   - producer premium).
5. By uid (=agent_identifiers plus disaggregate if provided), compute means, sds, residual-based downside measures (loss-only squared residuals and their frequency), and derived statistics (variance, CV, LAPV, LRPV, normalized forms).
6. Compute **relative** metrics (insured vs. uninsured ratios): Relmean, Relsd, Relcv, Rellapv, Rellrpv, Relnlapv, Relnlrpv, Relvar. Base Revenue* statistics are dropped before the final merge to keep results compact.
7. Aggregate insurance performance by group: mean liability, total_premium, subsidy_amount, producer_premium, indemnity, premium and LCR rates (Simrate, SimrateP, Simsuby, Simlcr), and **group sums** for lr_indemnity and lr_premium. Merge with the relative metrics.

Join note The join uses data[simdt, on = <keys>, nomatch = 0], i.e., it returns rows aligned to the simulation table entries that match the agent keys.

Value

Invisibly returns the saved file path (expected_<year>_<task-range>.rds).

compute_supplemental_current

Aggregate supplemental results for the current environment

Description

Scale selected SCO/ECO factors by base-policy weights (`sco`, `eco90`, `eco95`), aggregate by policy keys, append base outcomes, and label the rollup as `"Basic+CURRENT"`.

Usage

```
compute_supplemental_current(base_policy_data, supplemental_factors)
```

Arguments

`base_policy_data`
: data.table. Base-policy outcomes (contains keys, weights, and monetary fields).

`supplemental_factors`
: data.table. Supplemental outcomes from `compute_supplemental_factors` including sup.

Value

A data.table aggregated by policy keys with: `revenue`, `liability`, `total_premium`, `subsidy_amount`, `producer_premium`, `indemnity`, and `combination`.

compute_supplemental_factors

Compute supplemental policy factors (SCO/ECO)

Description

Compute shallow-loss protection, premiums, and indemnities for one SCO/ECO endorsement offering, aligning plan families and joining ADM rating inputs.

Usage

```
compute_supplemental_factors(base_policy, adm, plan, subsidy, trigger)
```

Arguments

`base_policy`	data.table. Base-policy rows (keys, yields, prices, liability, etc.).
`adm`	data.table. Rating inputs with `base_rate` and join keys.
`plan`	Integer. Plan code in the offering (e.g., 31-33, 51-53, 87-89).
`subsidy`	Numeric. Subsidy factor (e.g., `0.65`, `0.80`, `0.44`).
`trigger`	Numeric. Coverage trigger level (e.g., `0.86`, `0.90`, `0.95`).

Details

Handles plan families via offsets (31-33, 41-43, 51-53, 87-89). For plans 87-89 (ECO), the `coverage_level_percent` for ADM is matched to the `trigger` (with a small tolerance), and the subsidy factor special-case is applied for underlying plan code 1. Emits a standard `sup` label like `"SCO8665"` or `"ECO9544"`.

Value

A data.table with columns: `commodity_year`, `state_code`, `county_code`, `commodity_code`, `type_code`, `practice_code`, `unit_structure_code`, `insurance_plan_code`, `coverage_level_percent`, `liability`, `total_premium`, `subsidy_amount`, `producer_premium`, `indemnity`, `sup`.

`compute_supplemental_full` *Aggregate supplemental full-participation results*

Description

Given selected `sup` labels, sum their monetary fields, append base outcomes, and produce a final rollup by policy keys with a descriptive `combination` label.

Usage

```
compute_supplemental_full(
  base_policy_data,
  supplemental_factors,
  supplemental_pick
)
```

Arguments

`base_policy_data`
: data.table. Base-policy outcomes.

`supplemental_factors`
: data.table. Results from `compute_supplemental_factors`.

`supplemental_pick`
: Character vector of `sup` labels to include.

Details

The function self-filters `supplemental_factors` to the provided `supplemental_pick` (after dropping empties), aggregates within keys, appends base outcomes, and re-aggregates.

Value

A data.table aggregated by the policy keys with: `revenue`, `liability`, `total_premium`, `subsidy_amount`, `producer_premium`, `indemnity`, and `combination`.

`compute_supplemental_incremental` *Compute incremental supplemental results at an adoption rate*

Description

Build an incremental scenario by scaling `SCO8665` supplemental dollars by a user-specified adoption rate, aggregating by keys, and appending base outcomes.

Usage

```
compute_supplemental_incremental(
  base_policy_data,
  supplemental_factors,
  adoption_rate
)
```

Arguments

`base_policy_data`	data.table. Base-policy outcomes.
`supplemental_factors`	data.table. Output from `compute_supplemental_factors` filtered to `sup == "SCO8665"`.
`adoption_rate`	Numeric. Percentage (e.g., `10` for 10\ scale incremental supplemental amounts.

Value

A data.table aggregated by the policy keys with: `revenue`, `liability`, `total_premium`, `subsidy_amount`, `producer_premium`, `indemnity`, and `combination`.

`dispatcher_supplemental_simulation` *Dispatcher: simulate supplemental outcomes for one draw*

Description

Orchestrate the full supplemental simulation workflow for a given crop year and draw: build the agent panel, compute base-policy results, generate supplemental factors, assemble *Current*, *Full*, and *Incremental* scenarios, and write the combined results to disk.

Usage

```
dispatcher_supplemental_simulation(
  sim,
  year,
  agents_directory = "data/cleaned_agents_data",
 cleaned_rma_sco_and_eco_adm_file_path = "data/cleaned_rma_sco_and_eco_adm.rds",
  output_directory = NULL
)
```

Arguments

`sim`	Integer. Draw number used in data building and the filename.
`year`	Integer. Crop year.
`agents_directory`	Character. Directory for cleaned agents data.
`cleaned_rma_sco_and_eco_adm_file_path`	Character. Path to RDS of SCO/ECO ADM with join keys and `base_rate`. Default: `"data/cleaned_rma_sco_and_eco_adm.rds"`.
`output_directory`	Character or `NULL`. Where to write results; see Details for default behavior.

Details

The pipeline:

1. `build_agent_simulation_data` to construct the panel.
2. `compute_base_policy_outcomes` for base outcomes.
3. `study_scenarios` to enumerate offerings/mixes.
4. Load SCO/ECO ADM; filter to `commodity_year == year`; average `base_rate` by key; drop invalid/zero rates.
5. Loop offerings through `compute_supplemental_factors`.
6. Build scenarios:
   - *Current*: `compute_supplemental_current`.
   - *Full*: `compute_supplemental_full`.
   - *Incremental*: `compute_supplemental_incremental`.
7. Aggregate base-only results, `rbind` all scenarios, and save as `simXXX.rds` in `output_directory`.

If `output_directory` is `NULL`, it defaults to `file.path(study_environment$wd$dir_sim, year)` (ensure `study_environment$wd$dir_sim` exists in the calling environment).

Value

Invisibly writes `simXXX.rds` to `output_directory`.

`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()
```

`farm_performance_metrics` *Farm performance metrics by scenario and disaggregate*

Description

Load `expected_<year>.rds`, derive outcome variables, compute deltas vs. baselines, trim extremes using quantile limits, aggregate (weighted mean/median) by requested disaggregates, and save a summarized `.rds`. Returns the saved path invisibly.

Usage

```
farm_performance_metrics(
  year,
 agent_identifiers = c("commodity_year", "state_code", "county_code", "commodity_code",
    "type_code", "practice_code", "unit_structure_code", "insurance_plan_code",
    "coverage_level_percent"),
 outcome_list = c("its", "Iits", "rrs1", "rrs2", "rrs3", "Irrs1", "Irrs2", "Irrs3",
   "sner1", "sner2", "sner3", "Simrate", "SimrateP", "Simsuby", "Simlcr", "rrp1",
    "rrp2", "rrp3", "itp"),
 combo,
 weight_variable = NULL,
 expected_directory = NULL,
 draw = NULL,
 draw_list_file_path = NULL,
 disaggregates = NULL,
 output_file_path = NULL,
 distributional_limits = c(0.05, 0.95)
)
```

Arguments

`year`	Policy year used to locate `expected_<year>.rds`.
`agent_identifiers`	Character vector of ID columns for grouping prior to long-pivot and averaging.
`outcome_list`	Character vector of outcome columns to reshape and aggregate.
`combo`	Target scenario (e.g., `"Basic+CURRENT"`, `"Basic+SCO8665"`, or another).
`weight_variable`	`NULL` for equal weights (=1) or a character name of a numeric weight column.
`expected_directory`	Directory containing `expected_<year>.rds`.
`draw`	Optional draw identifier used for filtering and filename tag.
`draw_list_file_path`	Optional path to an RDS (named list) with the draw table; required if `draw` is not `NULL`.
`disaggregates`	Optional character vector of additional disaggregate columns (alongside `"FCIP"`).
`output_file_path`	Output file path

distributional_limits
: Numeric length-2 vector of lower/upper probabilities (e.g., c(0.05, 0.95)); must satisfy 0 < p1 < p2 < 1.

Details

Steps:

1. Filter rows to combination %in% {"Basic+CURRENT", combo, "Basic+SCO8665"}.
2. Create derived metrics: rrs1/2/3, its, flags Irrs*/Iits, sner*, percent/level transforms (rrp*, itp), and scale Sim* by 100.
3. Reshape to long on outcome_list, drop non-finite values, average within identifiers (agent_identifiers, and weight_variable if provided), scenario, variable.
4. Join baselines: if combo != "Basic+CURRENT", add "Basic+CURRENT" as base00; if combo = {"Basic+SCO8665", add "Basic+SCO8665" as base01. Compute chglvl00/01 and chgpct00/01 (guard divide-by-zero).
5. Build labels PLAN, RPYP, COV, STRUCT.
6. Compute trimming limits per (variable, combination, state_code, IRR, commodity_code) using distributional_limits (default c(0.05,0.95)), require n greater or equal to 20, and cap to *T columns.
7. For each of c("FCIP", disaggregates), compute weighted mean and weighted median of raw and trimmed metrics; stack results and write output.

Value

Invisibly returns the character path of the saved .rds.

Required columns

All agent_identifiers, plus: combination, state_code, county_code, commodity_code, type_code, practice_code, IRR, Relcv, Relnlrpv, Relnlapv, Relmean, Simrate, SimrateP, Simsuby, Simlcr, coverage_level_percent, unit_structure_code, insurance_plan_code. If weight_variable is not NULL, that column must exist and be numeric.

Note

Baseline joins use nomatch = 0 by design, so rows missing in the baseline are dropped before delta computation. Change to nomatch = NA if you prefer to retain such rows with NA deltas.

See Also

data.table::data.table, data.table::melt, matrixStats::weightedMedian

fcipSupplementalLab_controls

Create a control list of adjustment factors for FCIP-related packages

Description

Create a control list of adjustment factors for FCIP-related packages

Usage

```
fcipSupplementalLab_controls()
```

Value

A named list of control parameters, ready to be passed to other simulation functions.

get_fcip_agents

Build FCIP record-level dataset for a commodity year from calibration artifacts and RMA reference tables

Description

Downloads year-specific calibration artifacts from GitHub (revenue draws, calibrated yields, and compressed projected prices), restricts revenue-draw records to insurance pools present in `relevant_adm`, joins SOB/TPU reference records from `relevant_sob` using explicit and validated keys, computes observed premium-rate and subsidy-share measures, attaches yield and price fields, filters invalid records, and returns a streamlined `data.table`.

Usage

```
get_fcip_agents(
  year,
  relevant_adm,
  relevant_sob,
  keep_variables = NULL,
  temporary_dir = tempdir()
)
```

Arguments

`year`	Integer. Commodity year to process (e.g., 2015).
`relevant_adm`	data.table. Pre-filtered administrative table defining the set of relevant insurance pools. Must contain at least `state_code`, `county_code`, `commodity_code`, `type_code`, and `practice_code`.
`relevant_sob`	data.table. Pre-filtered SOB/TPU-style table used to construct `producer_id` and to join reference records into the revenue-draw data. Must contain the fields required to build `producer_id`: `state_code`, `county_code`, `commodity_code`, `type_code`, `practice_code`, `unit_structure_code`, `insurance_plan_code`, `coverage_type_code`, `coverage_level_percent`. If present, `commodity_year` may also be used in joins.

keep_variables Character vector of additional column names to retain (if present after all joins and filtering). Default is NULL.

temporary_dir Character. Directory used to store downloaded calibration artifacts. Defaults to tempdir(). The directory will be created if it does not exist.

Details

The function expects calibration artifacts to be available as GitHub release assets with the following structure:

- Repository ftsiboe/rfcipCalibrate, tag revenue_draw: revenue_draw_<year>.rds
- Repository ftsiboe/rfcipCalibrate, tag calibrated_yield: calibrated_yield_<year>.rds
- Repository ftsiboe/rfcipCalcPass, tag adm_compressed: <year>_A00810_Price.rds

Revenue-draw records are first restricted to insurance pools observed in relevant_adm. SOB/TPU records are then joined **into** the revenue-draw data (inner join), ensuring the unit of observation remains the revenue-draw / policy-unit record.

Observed ratios are computed using NA-safe denominators:

- observed_premium_rate = total_premium_amount / liability_amount (rounded to 8 decimals)
- observed_subsidy_percent = subsidy_amount / total_premium_amount (rounded to 3 decimals)

Denominators that are non-finite, NA, or non-positive yield NA_real_.

Projected prices are aggregated to the mean by commodity_year, state_code, county_code, commodity_code, type_code, and practice_code, and are left-joined into the output so no additional rows are created.

The function filters out records with non-finite calibrated_yield values. Records with missing observed ratios are retained.

Convenience columns are added for downstream FCIP pipelines: planted_acres = insured_acres, and price_election, insured_share, and damage_area_rate are set to 1.

Value

A data.table containing one row per retained FCIP record, including identifying keys, selected calibration and draw fields, observed premium and subsidy measures, projected price, and any variables listed in keep_variables that exist. Returns NULL if an error occurs.

Side effects and requirements

- Downloads external files using piggyback::pb_download().
- Reads and writes temporary RDS files in temporary_dir.
- Requires the calibration artifacts to be accessible via GitHub releases.

`get_study_releases` *Download all assets from a GitHub release with rate limiting*

Description

Downloads all files attached to a specified GitHub release tag while **throttling requests** to avoid GitHub rate limits and abuse protection. This helper is designed for releases containing many or large assets (e.g., `.rds` outputs generated on HPC systems).

Usage

```
get_study_releases(
  owner,
  repository,
  release_tag,
  output_directory = NULL,
  github_token = NULL,
  sleep_seconds = 3,
  max_rounds = 3
)
```

Arguments

`owner`	Character string giving the GitHub repository owner (e.g., `"ftsiboe"`).
`repository`	Character string giving the GitHub repository name (e.g., `"indexDesignWindows"`).
`release_tag`	Character string specifying the GitHub release tag whose assets should be downloaded.
`output_directory`	Optional character string specifying the local directory where release assets should be saved. Defaults to `data-raw/releases/{release_tag}`.
`github_token`	Optional GitHub personal access token (PAT). Passed to **piggyback** via `.token`. Strongly recommended.
`sleep_seconds`	Numeric scalar giving the number of seconds to pause between individual file downloads. Increasing this value reduces the likelihood of triggering GitHub rate limits.
`max_rounds`	Integer giving the maximum number of retry rounds. Each round attempts to download any files still missing locally.

Details

The function downloads assets incrementally, pauses between requests, and retries failed downloads across multiple rounds. Already-downloaded files are skipped, allowing the function to safely resume after interruptions or rate-limit errors.

The function:

1. Constructs a default output directory (`data-raw/releases/{release_tag}`) if none is supplied.
2. Queries GitHub once to obtain the list of release assets.
3. Downloads assets **one at a time** using **piggyback**.

4. Pauses for `sleep_seconds` between downloads to reduce request bursts.
5. Retries failed or missing downloads for up to `max_rounds`.
6. Skips files that already exist locally.

This approach is especially useful when GitHub returns repeated `HTTP 403 (Forbidden)` errors during bulk downloads.

Authentication via a GitHub personal access token (PAT) is strongly recommended, even for public repositories.

Value

Invisibly returns `NULL`. Files are downloaded for their side effects.

`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.

`study_scenarios` *Build study scenarios (SCO/ECO offerings and mixes)*

Description

Define the endorsement offerings (plan family - trigger - subsidy - label) and the full-participation SCO/ECO mixes to evaluate for a given year.

Usage

```
study_scenarios(year)
```

Arguments

`year`	Integer. Crop year used to determine available ECO variants.

Details

For years `>= 2021`, ECO 90/44 and 95/44 variants are added and the participation set is expanded accordingly. Offerings create `sup` labels such as `"SCO8665"`, `"SCO9080"`, `"ECO9044"`, `"ECO9544"`.

Value

A named list with:

- `offerings`: data.table of `insurance_plan_code`, `Trigger`, `plan`, `Subsidy_factor`.
- `full_participation`: data.table of SCO/ECO label combinations to test (columns `sco`, `eco`).

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