# Package ‘CASdatasets’

November 13, 2019

**Type** Package  
**Title** Insurance Datasets  
**Version** 1.0-10  
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**Maintainer** Christophe Dutang <christophe.dutang@ensimag.fr>  
**Description** A collection of datasets, originally for the book ‘Computational Actuarial Science with R’ edited by Arthur Charpentier. Now, the package contains a large variety of actuarial datasets.  
**Depends** R (>= 3.0.0), xts, sp  
**Imports** lattice  
**License** GPL (>= 2)  
**NeedsCompilation** no  
**URL** [http://dutangc.free.fr/pub/RRepos/web/CASdatasets-index.html](http://dutangc.free.fr/pub/RRepos/web/CASdatasets-index.html)  
**BuildResaveData** best  
**LazyData** no

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A completed project by the Insurance Risk and Finance Research Centre (www.IRFRC.com) has assembled a unique dataset from Large Commercial Risk losses in Asia-Pacific (APAC) covering the period 2000-2013. The data was generously contributed by one global reinsurance company and two large Lloyd’s syndicates in London. This dataset is the result of the project co-lead by Dr Milidonis (IRFRC and University of Cyprus) and Enrico Biffis (Imperial College Business School), which can be referred to as the IRFRC LCR Dataset.

As expected, the dataset is fully anonymised, as the LCR losses are aggregated along a few dimensions. First, data is categorised based on the World Bank’s economic development classification. This means that losses either come from developed or developing countries. The second dimension used to aggregate the data is the time period covered. Data is grouped into (at least) two time-periods: the period before and after the 2008 crisis.

A large commercial risk (LCR) is defined as a loss caused by man-made risks (e.g. fire, explosion, etc.). We exclude natural catastrophe events, and started by focusing on claims that made the data provider incur a loss amount of at least EUR 1 million. We then extended our dataset to include claims leading to loss amounts smaller that EUR 1 million. Given time constraints, we only partially extended loss data by obtaining FGU losses larger than EUR 140k. One should note that any selection bias arising from the data collection exercise is driven by both data quality and reliability. Based on our experience, the latter two attributes are homogeneous across developed and developing countries APAC claims.

For further details, see the technical report: Benedetti, Biffis and Milidonis (2015a).

Usage

data(asiacomrisk)

Format

asiacomrisk contains 7 columns:

FGU From the Ground Up Loss (USD).
TIV Total Insurable Value (TIV) replaced with Total Sum Insured (TSI) when the TIV is not available (USD).
CountryStatus A character string for the country status: "Developed", "Emerging".
Usage A character string for the type of exposure hit by the loss: "Commercial", "Energy", "Manufacturing", "Misc.", "Residential".


DR A numeric for the destruction rate (FGU divided TIV capped to 1).

Source

IRFRC

References


Examples

# (1) load of data
#
data(asiacomrisk)
dim(asiacomrisk)

# (2) basic boxplots
#
asiacomrisk
boxplot(DR ~ Usage, data=asiacomrisk)
boxplot(DR ~ SubUsage, data=asiacomrisk)
boxplot(DR ~ Period, data=asiacomrisk)
boxplot(DR ~ CountryStatus, data=asiacomrisk)

________________________

ausautoBI8999 Automobile bodily injury claim dataset in Australia

________________________

Description

This data set contains information on 22036 settled personal injury insurance claims in Australia. These claims arose from accidents occurring from July 1989 through to January 1999. Claims settled with zero payment are not included.

Usage

data(ausautoBI8999)
Format

`ausautoBI8999` is a data frame of 8 columns and 1,340 rows:

- **AccDate**, **ReportDate**, **FinDate** The accident date, the reporting date, the finalization date, note that the day is always set to the first day of the month.
- **AccMth**, **ReportMth**, **FinMth** The accident month, the reporting month, the finalization month: 1 = July 1989, ..., 120 = June 1999).
- **OpTime** The operational time.
- **InjType1**, **InjType2**, **InjType3**, **InjType4**, **InjType5** The injury code for the people injured (up to five).
- **InjNb** Number of injured people.
- **Legal** A character string for: Has the policyholder a legal representation?
- **AggClaim** Aggregate settled amount of claims.

Source

[DeJongHellerBook](#)

References


Examples

```r
# (1) load of data
#
data(ausautoBI8999)
dim(ausautoBI8999)
head(ausautoBI8999)
```

---

**auscathist**

*Australian catastrophe historic*

Description

Historical disaster statistics in Australia from 1967 to 2014.

Usage

```r
data(auscathist)
```
Format

auscathist is a data frame of 9 columns:

Year  a numeric for the Year.
Quarter a numeric for the quarter of the year.
Date  a character string for the date.
FirstDay a Date object for the first day of natural catastrophe.
LastDay a Date object for the last day of natural catastrophe, when available.
Event  a character string describing the event.
Type  a factor describing the event type among the list: "Cyclone", "Earthquake", "Flood",
      "Flood,Storm","Hailstorm","Other","Power outage","Storm","Tornado","Weather",
      "Bushfire".
Location a character string describing the location.
OriginalCost Original cost in million of Australian dollars (AUD).
NormCost2011 Normed cost in million of 2011 Australian dollars (AUD) taking into account in-
     flation, change in wealth and population.
NormCost2014 Normed cost in million of 2014 Australian dollars (AUD) computed as the inflated
cost NormCost2011 using CPI.

Source


Examples

# (1) load of data  
#
# data(auscathist)

# (2) plot of data  
#
plot(ecdf(auscathist$NormCost2014))

| ausNLHYby | Australian Market - non-life insurance (company, state, public level) |

Description

Financial performance and financial position of insurers operating in Australia between 2005 and
2010 (company, state, public level).
Usage
data(ausNLHYClaimByState)
data(ausNLHYPremByState)
data(ausNLHYCapAdeqByComp)
data(ausNLHYFinPerfByComp)
data(ausNLHYFinPosByComp)
data(ausNLHYPrivInsur)
data(ausNLHYFinPerfPublic)
data(ausNLHYFinPosPublic)
data(ausNLHYOpIncExpPublic)
data(ausNLHYPremClaimPublic)
data(ausNLHYPubInsur)

Format

ausNLHYPremByState (Table 10) and ausNLHYClaimByState (Table 11) are data frames of 6 columns (values are in million of Australian dollars (AUD)):

- Class: Class of business.
- NSWACTYYYYMM: New South Wales / Australian Capital Territory for year YYYY.
- VICYYYYMM: Victoria in year YYYY reported on DateYYYYMM.
- QLDYYYYMM: Queensland in year YYYY reported on DateYYYYMM.
- SAYYYYYMM: South Australia in year YYYY reported on DateYYYYMM.
- WAYYYYYMM: Western Australia in year YYYY reported on DateYYYYMM.
- TAYYYYYMM: Tasmania in year YYYY reported on DateYYYYMM.
- NTYYYYMM: Northern Territory in year YYYY reported on DateYYYYMM.
- TotalYYYYMM: Total in year YYYY reported on DateYYYYMM.

where YYYYMM is the concatenation of the year YYYY and month MM, e.g. 200506.

AusNLHYPriInsur (Classification private) is a data frame of 6 columns (values are in thousand of Australian dollars (AUD)):

- Company: Company short name.
- FullNameYYYYMM: Full name of the company for year YYYY.
- DateYYYYMM: Date in year YYYY reported on DateYYYYMM.
- ClassificationYYYYMM: Classification in year YYYY reported on DateYYYYMM either Direct or Reinsurer.
- BranchYYYYMM: non empty when branch insurer in year YYYY reported on DateYYYYMM.
- RestrictionYYYYMM: Restriction on underwriting in year YYYY reported on DateYYYYMM.

where YYYYMM is the concatenation of the year YYYY and month MM, e.g. 200506.

AusNLHYCapAdeqByComp (Table 14) is a data frame of 6 columns (values are in thousand of Australian dollars (AUD)):

- Company: Company short name.
- DateYYYYMM: Balance Date for year YYYY.
• **MCRYYYYMM**: Minimum capital requirement in year YYYY reported on DateYYYYMM.

• **CapitalYYYYMM**: Capital base in year YYYY reported on DateYYYYMM.

• **SurplusYYYYMM**: Capital surplus in year YYYY reported on DateYYYYMM.

• **SolRatioYYYYMM**: Solvency coverage ratio in year YYYY reported on DateYYYYMM.

where YYYYMM is the concatenation of the year YYYY and month MM, e.g. 200506.

**ausNLHYFinPerfByComp** (Table 12) is a data frame of 9 columns (values are in thousand of Australian dollars (AUD)):

- **Company**: Company short name.
- **DateYYYYMM**: Balance Date for year YYYY.
- **GWPYYYYMM**: Gross written premium revenue in year YYYY reported on DateYYYYMM.
- **REYYYYMM**: Outwards reinsurance expense in year YYYY reported on DateYYYYMM.
- **NWYYYYMM**: Net written premium revenue in year YYYY reported on DateYYYYMM.
- **GICYYYYYMM**: Gross incurred claims in year YYYY reported on DateYYYYMM.
- **NRRYYYYMM**: Non-reinsurance recoveries revenue in year YYYY reported on DateYYYYMM.
- **RRYYYYMM**: Reinsurance recoveries revenue in year YYYY reported on DateYYYYMM.
- **NICYYYYMM**: Net incurred claims in year YYYY reported on DateYYYYMM.
- **UWEYYYYMM**: Underwriting expenses in year YYYY reported on DateYYYYMM.
- **UWRYYYYMM**: Underwriting result in year YYYY reported on DateYYYYMM.
- **IIYYYYMM**: Investment income in year YYYY reported on DateYYYYMM.
- **OIYYYYMM**: Other items in year YYYY reported on DateYYYYMM.
- **NPATYYYYMM**: Net profit-loss after tax in year YYYY reported on DateYYYYMM.

where YYYYMM is the concatenation of the year YYYY and month MM, e.g. 200506.

**ausNLHYFinPosByComp** (Table 13) is a data frame of 7 columns (values are in thousand of Australian dollars (AUD)):

- **Company**: Company short name.
- **InvestYYYYMM**: Investments for year YYYY.
- **TotalAssetYYYYMM**: Total assets in year YYYY reported on DateYYYYMM.
- **ClaimReservYYYYMM**: Outstanding claims provision in year YYYY reported on DateYYYYMM.
- **PremLiabYYYYMM**: Premium liabilities in year YYYY reported on DateYYYYMM.
- **ClaimReservYYYYMM**: Total liabilities in year YYYY reported on DateYYYYMM.
- **TotalLiabYYYYMM**: Shareholders equity in year YYYY reported on DateYYYYMM.
- **EquityYYYYMM**: Shareholders equity in year YYYY reported on DateYYYYMM.

where YYYYMM is the concatenation of the year YYYY and month MM, e.g. 200506.

**ausNLHYPubInsur** (Classification public) is a data frame of 1 column:

- **CompanyYYYYMM**: Company name for year YYYY.

**ausNLHYFinPerfPublic** (Table 15), **ausNLHYOpIncExpPublic** (Table 16), are data frames of 2 columns (values are in million of Australian dollars (AUD)):

- **Content**: Content.
- **TotalYYYYMM**: Total for year YYYY.
ausNLHYby

ausNLHYFinPosPublic (Table 17) is a data frame of 3 columns (values are in million of Australian dollars (AUD)):

- Content: Content.
- TotalYYYYMM: Total for year YYYY.
- InsideAustraliaOnlyYYYYMM: Inside Australia Only for year YYYY.

ausNLHYPremClaimPublic (Table 18) is a data frame of 6 columns (values are in million of Australian dollars (AUD)):

- Class: Class of business.
- GWYYYYMM: Gross written premium revenue in year YYYY reported on DateYYYYMM.
- PEYYYYMM: Premium revenue in year YYYY reported on DateYYYYMM.
- REYYYYMM: Reinsurance expense in year YYYY reported on DateYYYYMM.
- GICYYYYMM: Gross incurred claims in year YYYY reported on DateYYYYMM.
- RORYYYYYMM: Reinsurance recoveries revenue in year YYYY reported on DateYYYYMM.

where YYYYMM is the concatenation of the year YYYY and month MM, e.g. 200506.

Source

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See Also

ausNLHYtotal for aggregate level, ausNLHYlloyd for LLoyds and ausNLHYglossary for glossary notes.

Examples

```r
# (1) by company data
#
data(ausNLHYCapAdeqByComp)
data(ausNLHYFinPerfByComp)
data(ausNLHYFinPosByComp)

# (2) by state data
#
data(ausNLHYClaimByState)
data(ausNLHYPremByState)

# (3) public sector data
#
data(ausNLHYFinPerfPublic)
data(ausNLHYFinPosPublic)
data(ausNLHYOpIncExpPublic)
data(ausNLHYPremClaimPublic)
```
Description

Financial performance and financial position of insurers operating in Australia between 2005 and 2010 (Glossary).

Details

Glossary notes:

- Capital base is the amount of eligible capital held by an insurer to provide a buffer against losses that have not been anticipated and, in the event of problems, enable the insurer to continue operating while those problems are addressed or resolved. For locally incorporated insurers it is the sum of tier 1 capital (net of deductions) and tier 2 capital. Capital base for branch insurers is derived from net assets inside Australia.
- Captive insurer is a company within a group of related companies performing the function of insurer to that group.
- Classes of business in tables 7-11 are shown in order of risk capital factors as described in guidance note GGN 110.3.
- Direct insurers are those insurers who, excluding intra-group arrangements, predominantly undertake liability by way of direct insurance business.
- Earned premium (as defined in AASB 1023) is the amount of premium earned during the financial year and includes movements in the unearned premium provision.
- Gross claims expense (as per table 11) relates to: claims that are paid during a financial period; and recognised claims liabilities (i.e. movement in outstanding claims provision).
- Gross incurred claims comprises claims paid during the period, movements in the outstanding claims provision and movements in premium liabilities.
- Gross premium revenue is recognised fully when the business is written. The accounting concepts of earned and unearned premium are no longer recognised under the APRA prudential framework, hence this item is not consistent with AASB 1023 requirements. Instead, the potential claims liabilities arising from the uncovered term of written insurance business are recognised through the creation of premium liabilities.
- LMI (Lenders mortgage insurers) provide cover to protect lenders from default by borrowers on loans secured by mortgage. Mortgage insurers are substantially different to other insurers and are subject to special condition of authority.
- Lower tier 2 ratio is lower tier 2 capital divided by tier 1 capital (net of deductions). The regulatory maximum for this ratio is 50 percent.
- Lloyd’s is a London based insurance market in which business is underwritten by both individuals and corporate members who form syndicates to accept risk.
- Minimum capital requirement is the amount of risk-based capital APRA requires general insurers to hold to meet its insurance obligations under a wide range of circumstances.
- Net incurred claims is gross incurred claims net of reinsurance recoveries revenue and non-reinsurance recoveries revenue.
- Net loss ratio is net incurred claims divided by net premium revenue. Net premium revenue is gross premium revenue net of outwards reinsurance expense.
• Net profit/loss refers to profit or loss from ordinary activities after income tax, before extraordinary items.
• Non-reinsurance recoverables comprise recoverables from subrogation, salvage, sharing arrangements etc, net of provision for doubtful debts.
• Non-reinsurance recoveries revenue comprises amounts the insurer has recovered or is entitled to recover from subrogation, salvage and other non-reinsurance recoveries.
• Other assets comprises investment income receivable, other reinsurance assets receivable from reinsurers (i.e. other than reinsurance recoveries), GST receivable, other receivables, tax assets, plant and equipment (net of depreciation) and other assets.
• Other investments are strategic investments/acquisitions and other investments that do not constitute investments integral to insurance operations.
• Other items comprises other operating income, goodwill amortisation and income tax expense or benefit. Other liabilities comprises creditors and accruals, other provisions and other liabilities. Other operating expenses are all operating expenses not related to underwriting.
• Outstanding claims provision is the insurer’s liability for outstanding claims. It recognises the potential cost to the insurer of settling claims which it has incurred at the reporting date (including estimates of claims that have not yet been notified to the insurer), but which have not been paid. The amount reported is after taking account of inflation and discounting, without deducting reinsurance and non-reinsurance recoverables.
• Outwards reinsurance expense is premium ceded to reinsurers, recognised as an expense fully when incurred or contracted.
• Payables on reinsurance contracts comprise amounts payable to reinsurers. This includes premiums payable but not yet due for payment, deposits withheld from reinsurers, commissions due to reinsurers and the reinsurers’ portion of recoveries and salvage.
• Premium liabilities relate to the future claims arising from future events insured under existing policies accepted. This fully prospective determination is a more effective means of recognising potential risk than the accounting concept of unearned premium. The amount reported is after taking account of inflation and discounting, without deducting reinsurance and non-reinsurance recoveries.
• Premium receivables are premiums due, net of provision for doubtful debts, including unclosed business written close to the reporting date.
• Reinsurance recoverables comprise amounts recoverable under reinsurance contracts. Reinsurance and other recoverables is the aggregate of reinsurance recoverables and non-reinsurance recoverables.
• Reinsurance recoveries revenue comprises amounts the insurer has recovered or is entitled to recover from reinsurers on incurred claims during the reporting period.
• Reinsurers are those insurers who, excluding intra-group arrangements, predominantly undertake liability by way of reinsurance business.
• Return on assets is net profit/loss divided by the average on-balance sheet total assets for the period. Return on equity is net profit/loss divided by the average shareholders’ equity for the period.
• Run-off insurers are restricted by APRA from writing new or renewal insurance business. However, the company may still be acting as an insurance agent, broker or underwriting agent for other general insurers.
• Solvency coverage is capital base divided by minimum capital requirement.
• Tier 1 capital (net of deductions) comprises the highest quality capital elements, including: paid-up ordinary shares, general reserves, retained earnings, current year earnings net of expected dividends and tax expenses, technical provisions in excess of those required by GPS 210, non-cumulative irredeemable preference shares and other “innovative” capital instruments. This amount is net of goodwill, other intangible assets and future income tax benefits.
Source

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See Also

ausNLHYby for company, state, public level, ausNLHYlloyd for LLoyds and ausNLHYtotal for aggregate level.

| ausNLHYlloyd | Australian Market - non-life insurance (LLoyds insurance business) |

Description


Usage

data(ausNLHYlloydAsset)
data(ausNLHYlloydGPI)
data(ausNLHYlloydUWAcc)
data(ausNLHYlloydUWRes)

Format

ausNLHYlloydUWAcc (Table 15) and ausNLHYlloydUWAcc (Table 16) are data frames of 4 columns (values are in thousand of Australian dollars (AUD)):

- **Content**: Content.
- **AccYear2YrAgoYYYYMM**: value in the 2-year-ago accounting year in year YYYY reported in December.
- **AccYear1YrAgoYYYYMM**: value in the 1-year-ago accounting year in year YYYY reported in December.
- **AccYear0YrAgoYYYYMM**: value in the current accounting year in year YYYY reported in December.

where YYYYMM is the concatenation of the year YYYY and month MM=12, e.g. 200512.

ausNLHYlloydGPI (Table 17) is a data frame of 4 columns (values are in thousand of Australian dollars (AUD)):

- **Content**: Content.
- **DirectYYYYMM**: Direct premiums (gross) including inward facultative reinsurance in year YYYY reported in December.
- **InwardYYYYMM**: Inward treaty reinsurance premiums (gross) in year YYYY reported in December.
- **TotalYYYYMM**: Total premium income (gross) in year YYYY reported in December.
where YYYYMM is the concatenation of the year YYYY and month MM=12, e.g. 200512.

`ausNLHYLloydAsset` (Table 18) is a data frame of 4 columns (values are in thousand of Australian dollars (AUD)):

- **Content**: Content.
- **TrustFundYYYYMM**: Lloyds Australia trust fund in year YYYY reported in December.
- **AssetFund1. YYYYMM**: Lloyds Australia joint asset fund No.1 in year YYYY reported in December.
- **AssetFund2. YYYYMM**: Lloyds Australia joint asset fund No.2 in year YYYY reported in December.

where YYYYMM is the concatenation of the year YYYY and month MM=12, e.g. 200512.

**Details**

It is not possible to compare Lloyd’s with authorised companies. Lloyd’s operates a unique three year accounting system that differs substantially from normal practices. Different classes of business are also used.

The individual syndicates, which are members of the Lloyd’s market, are independent entities which are supervised by the Financial Services Authority (FSA) in the UK not by APRA. However, for the protection of policy holders in Australia, Lloyd’s is required to maintain trust funds in Australia (refer to Lloyd’s Assets Table 18).

**Source**

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**See Also**

`ausNLHby` for company, state, public level, `ausNLHYtotal` for aggregate level and `ausNLHYglossary` for glossary notes.

**Examples**

```r
# (1) lloyds data
#
data(ausNLHYLloydAsset)
data(ausNLHYLloydGPI)
data(ausNLHYLloydUWAcc)
data(ausNLHYLloydUWRes)
```
**Description**

Financial performance and financial position of insurers operating in Australia between 2005 and 2010 (aggregate level).

**Usage**

data(ausNLHYCapAdeq)
data(ausNLHYFinPerf)
data(ausNLHYFinPos)
data(ausNLHYLiability)
data(ausNLHYOffProf)
data(ausNLHYOpIncExp)
data(ausNLHYPremClaim)
data(ausNLH PryInsur)
data(ausNLHYPubInsur)
data(ausNLHYRecAASB)
data(ausNLHYReserve)

**Format**

All values are in million of Australian dollars (AUD).

*ausNLHYFinPerf* (Table 1), *ausNLHYCapAdeq* (Table 5), *ausNLHYOpIncExp* (Table 2) are data frames of 4 columns:

- **Content**: Content.
- **InsurersYYYYMM**: Insurers for year YYYY.
- **ReinsurersYYYYMM**: Reinsurers in year YYYY reported on DateYYYYMM.
- **TotalYYYMM**: Total in year YYYY reported on DateYYYYMM.

where YYYYMM is the concatenation of the year YYYY and month MM, e.g. 200506.

*ausNLHYRecAASB* (Table 6) is data frames of 4 columns:

- **Content**: Content.
- **NBInsurersYYYYMM**: Non-branch Insurers for year YYYY.
- **NBReinsurersYYYYMM**: Non-branch Reinsurers in year YYYY reported on DateYYYYMM.
- **NBTotalYYYYMM**: Non-branch Total in year YYYY reported on DateYYYYMM.

where YYYYMM is the concatenation of the year YYYY and month MM, e.g. 200506.

*ausNLHYFinPos* (Table 3) is a data frame of 5 columns:

- **Content**: Content.
- **InsurersYYYYMM**: Insurers for year YYYY.
ausNLHYtotal

- ReinsurersYYYYMM: Reinsurers in year YYYY reported on DateYYYYMM.
- TotalYYYYMM: Total in year YYYY reported on DateYYYYMM.
- InsideAustraliaOnlyYYYYMM: InsideAustraliaOnly in year YYYY reported on DateYYYYMM.

where YYYYMM is the concatenation of the year YYYY and month MM, e.g. 200506.

ausNLHYPremClaim (Table 7) is a data frame of 6 columns:

- Class: Class of business.
- GWPYYYYMM: Gross written premium revenue in year YYYY reported on DateYYYYMM.
- REYYYYMM: Outwards reinsurance expense in year YYYY reported on DateYYYYMM.
- NWYYYYMM: Net written premium revenue in year YYYY reported on DateYYYYMM.
- GICYYYYYMM: Gross incurred claims in year YYYY reported on DateYYYYMM.
- RRYYYYYMM: Reinsurance recoveries revenue in year YYYY reported on DateYYYYMM.

where YYYYMM is the concatenation of the year YYYY and month MM, e.g. 200506.

ausNLHYReserve (Table 8) is a data frame of 5 columns:

- Class: Class of business.
- GORYYYYYMM: Gross Outstanding Reserve in year YYYY reported on DateYYYYMM.
- RRYYYYYMM: Reinsurance Recoverables in year YYYY reported on DateYYYYMM.
- NRRYYYYMM: Non Reinsurance Recoverables in year YYYY reported on DateYYYYMM.
- NORYYYYYMM: Net Outstanding Reserve in year YYYY reported on DateYYYYMM.

where YYYYMM is the concatenation of the year YYYY and month MM, e.g. 200506.

ausNLHYLiability (Table 9) is a data frame of 5 columns:

- Content: Content.
- GPLYYYYMM: Gross Premium Liability in year YYYY reported on DateYYYYMM.
- RRYYYYMM: Reinsurance Recoverables in year YYYY reported on DateYYYYMM.
- NRRYYYYMM: Non Reinsurance Recoverables in year YYYY reported on DateYYYYMM.
- NPLLYYYYMM: Net Premium Liability in year YYYY reported on DateYYYYMM.

where YYYYMM is the concatenation of the year YYYY and month MM, e.g. 200506.

ausNLHYOffProf (Table 4) is a data frame of 7 columns:

- Content: Content.
- AusInsurersYYYYMM: Australian Insurers for year YYYY.
- AusReinsurersYYYYMM: Australian Reinsurers in year YYYY reported on DateYYYYMM.
- AusTotalYYYYMM: Australian Total level in year YYYY reported on DateYYYYMM.
- OffInsurersYYYYMM: Offshore Insurers for year YYYY.
- OffReinsurersYYYYMM: Offshore Reinsurers in year YYYY reported on DateYYYYMM.
- OffTotalYYYYMM: Offshore Total level in year YYYY reported on DateYYYYMM.

where YYYYMM is the concatenation of the year YYYY and month MM, e.g. 200506.

Source

Data is copyrighted by Australian Prudential Regulation Authority (APRA) and is under the Creative Commons - By licence. Please refer to http://www.apra.gov.au/
See Also

*ausNLHYby* for company, state, public level, *ausNLHYlloyd* for LLoyds and *ausNLHYglossary* for glossary notes.

Examples

```r
# (1) private sector data
#
data(ausNLHYCapAdeq)
data(ausNLHYFinPerf)
data(ausNLHYFinPos)
data(ausNLHYLiability)
data(ausNLHYOffProf)
data(ausNLHYOpIncExp)
data(ausNLHYPremClaim)
data(ausNLHYPrivInsur)
data(ausNLHYPubInsur)
data(ausNLHYRecAASB)
data(ausNLHYReserve)
```

---

### ausNSW

**Australian Statistics - New South Wales in 2004**

**Description**


**Usage**

```r
data(ausNSWdriver04)
data(ausNSWdeath02)
```

**Format**

*ausNSWdriver04* is 2-element list containing the following dataframes.

*ausNSWdriver04$injury* consists of all drivers involved in a crash in 2004 in New South Wales, Australia. There are a total of 82659 drivers in the data set. Drivers with unknown age, age less than 17 years, or road user class “Other” are omitted, leaving 76341 cases. *ausNSWdriver04$injury* contains the driver age, the gender, the vehicle class, the crash degree, and the observed number of crashes.

*ausNSWdriver04$alcohol* consists of drivers involved in a crash in 2004 in New South Wales, Australia, in which the involvement of blood alcohol concentration (BAC) was known. Drivers with unknown age, age less than 17 years, or unknown BAC are omitted, leaving 58890 cases. *ausNSWdriver04$alcohol* contains the driver age, the gender, the blood alcohol concentration, the crash degree, and the observed number of crashes.

*ausNSWdeath02* is 2-element list containing the following dataframes.
ausprivauto

ausNSWdeath02$allcause contains all-cause mortality data for New South Wales, Australia in 2002, by age band and gender.

ausNSWdeath02$diabete contains the number of deaths due to diabetes in New South Wales, Australia in 2002, provided by the Australian Institute of Health and Welfare, from their mortality database.

Source
DeJongHellerBook

References

Examples

```r
# (1) data
#
# data(ausNSWdriver04)
data(ausNSWdeath02)
```

ausprivauto

Automobile claim datasets in Australia

Description

Third party insurance is a compulsory insurance for vehicle owners in Australia. It insures vehicle owners against injury caused to other drivers, passengers or pedestrians, as a result of an accident.

The ausprivauto0405 dataset is based on one-year vehicle insurance policies taken out in 2004 or 2005. There are 67856 policies, of which 4624 had at least one claim.

The ausMTPL8486 dataset records the number of third party claims in a twelve-month period between 1984 and 1986 in each of 176 geographical areas (local government areas) in New South Wales, Australia.

The ausprivautolong is a simulated dataset containing counts of claims for 40 000 policies, for three periods (years). The simulation is based on a true non-life portfolio. The risk factors are driver’s age and vehicle value. Each policy is regarded as a cluster, and hence there are $3 \times 40\,000 = 120\,000$ records.

Usage

```r
data(ausprivautolong)
data(ausMTPL8486)
data(ausprivauto0405)
```
Format

`ausprivauto0405` is a data frame of 9 columns and 67,856 rows:

- **Exposure**  The number of policy years.
- **VehValue**  The vehicle value in thousand of AUD.
- **VehAge**  The vehicle age group.
- **VehBody**  The vehicle body group.
- **Gender**  The gender of the policyholder.
- **DrivAge**  The age of the policyholder.
- **ClaimOcc**  Indicates occurrence of a claim.
- **ClaimNb**  The number of claims.
- **ClaimAmount**  The sum of claim payments.

`ausMTPL8486` is a data frame of 7 columns and 176 rows:

- **LocalGov**  The local government area.
- **StatDiv**  The vehicle value in thousand of AUD.
- **ClaimNb**  The number of third-party claims.
- **AccNb**  The number of accidents.
- **KillInjNb**  The number of killed or injured.
- **Pop**  The population size.
- **PopDens**  The population density.

`ausprivauto0405` is a data frame of 6 columns and 120,000 rows:

- **IDpol**  The policy identification number.
- **DrivAge**  The age of the policyholder.
- **VehValue**  The vehicle value in thousand of AUD.
- **Periode**  The period number.
- **ClaimNb**  The number of claims.
- **ClaimOcc**  Indicates occurrence of a claim.

Source

DeJongHellerBook

References

Examples

# (1) load of data
#
data(ausprivautolong)
data(ausMTPL8486)
data(ausprivauto0405)

Description

Dataset `austri1autoBI7895` contains claim triangles from an Australian non-life insurer between 1978 and 1995 for bodily injuries. `austri1autoBI7895` is a list of 5 elements: a triangle of paid amounts, a triangle of incurred amounts, a triangle of notified claim number, a vector of exposure (in number of vehicle) and a vector of claim inflation indices. This corresponds respectively to Tables 3.3 (incr) and 3.2 (cumul); Table 3.12 (cumul); Tables 2.2 (incr) and 2.6 (cumul); Table B.1; Table B.2 of Taylor (2000). Note that claim amounts of `austri1autoBI7895` are incremental.

Dataset `austri2auto` contains claim triangles from an Australian non-life insurer in run-off. Note that claim amounts are incremental.

Usage

# 1st Line of Business
data(austri1autoBI7895)

# 2nd Line of Business
data(austri2auto)

Format

`austri1autoBI7895$paid`, `austri1autoBI7895$incur`, `austri1autoBI7895$nb` contain the insurance triangle, respectively for paid, incurred claims and claim number. `austri1autoBI7895$expo` contains the vector of exposure, `austri1autoBI7895$infl` contains the vector of inflation indexes. `austri2auto` contains the run-off insurance triangle.

Source

DeJongHellerBook
References


Examples

# (1) load of data
#
#
#1st Line of Business
data(austri1autoBI7895)

#2nd Line of Business
data(austri2auto)

# (2) graph
#
#
i <- 2
matplot(cbind(cumsum(austri1autoBI7895$paid[i,]), cumsum(austri1autoBI7895$incur[i,])),
type="l", ylab="Claim Amount (orig. USD)", xlab="Development Year",
main="Incurred vs. paid claim")

#claim number per 100 000 vehicles
fexpo <- 100000 / austri1autoBI7895$expo[rownames(austri1autoBI7895$nb)]
round(austri1autoBI7895$nb * fexpo, 1) #Table 2.1 of Taylor (2000)
matplot(apply(austri1autoBI7895$nb * fexpo, 1, cumsum), type="l",
main="number of claim notified per 100,000 veh", ylab="Cumulative number",
xlab="Development Year")

#paid claim inflated
fclaim <- austri1autoBI7895$infl["1995", "EndYear"] / austri1autoBI7895$infl[, "EndYear"]

f <- function(x, n) c(tail(x, -n), rep(NA, n))
infl <- cbind(fclaim, sapply(1:17, function(n) f(fclaim, n)))

matplot(apply(austri1autoBI7895$paid * infl, 1, cumsum), type="l", ylab="Claim Amount (1995 AUD)",
xlab="Development Year", main="Paid claim", col=1:10)
legend("bottomright", leg=rownames(austri1autoBI7895$paid), lty=1:5, col=1:10, cex=.5)

#incurred claim inflated
matplot(apply(austri1autoBI7895$incur * infl, 1, cumsum), type="l", ylab="Claim Amount (1995 AUD)",
xlab="Development Year", main="Incurred claim", col=1:10)
legend("bottomright", leg=rownames(austri1autoBI7895$incur), lty=1:5, col=1:10, cex=.5)
beaonre  

AON Re Belgian dataset

Description

The dataset was collected by the reinsurance broker AON Re Belgium and comprise 1,823 fire losses for which the building type and the sum insured are available.

Usage

data(beaonre)

Format

beaonre contains three columns and 1823 rows:

BuildType  The building type either A, B, C, D, E or F.
ClaimCost  The loss amount in thousand of Danish Krone (DKK).
SumInsured The sum insured in thousand of Danish Krone (DKK).

Source

http://lstat.kuleuven.be/Wiley/

References

Dataset used in Beirlant, Dierckx, Goegebeur and Matthys (1999), Tail index estimation and an exponential regression model, Extremes 2, 177-200.

Examples

# (1) load of data
#
data(beaonre)

# (2) plot and description of data
#
boxplot(ClaimCost ~ BuildType, data=beaonre, log="y", xlab="Building type", ylab="Claim size", main="AON Re Belgium data")
Description

The dataset was collected by the reinsurer Secura Re Belgium and comprises of 371 automobile claims from 1988 until 2001. The original claim numbers were corrected, among others, for inflation to reflect 2002 euros.

Usage

data(besecura)

Format

besecura contains two columns and 371 rows:

Year  The year of claim occurrence.
Loss  The loss amount in euros (EUR).

Source

http://lstat.kuleuven.be/Wiley/

References


Examples

# (1) load of data
#
data(besecura)

# (2) plot and description of data
#
plot(Loss ~ Year, data= besecura, log="y", xlab="Year", ylab="Claim size", main="Secura Re Belgian dataset")
Descriptive statistics of aggregate claims and premiums for the 41 Brazilian regions

**Description**

The datasets `braggclaim` and `braggprem` are descriptive statistics of the premium/claim per region and type of insurance coverage. Therefore, for each region, there are five rows, one for each type of insurance coverage, i.e. 405 row in total.

**Usage**

```r
data(braggclaim)
data(braggprem)
```

**Format**

`braggprem` contains 7 columns:

- **RegionNb**: A numeric for the region number.
- **RegionName**: A character for the region name.
- **Guarantee**: A character string for the guarantee.
- **ExpoAvg**: A numeric for the average of total exposures.
- **PremAvg**: A numeric for the average of gross written premium.
- **SumInsAvg**: A numeric for the average of sum insured.
- **StateAb**: A character string for the abbreviated state name.

`braggclaim` contains 6 columns:

- **RegionNb**: A numeric for the region number.
- **RegionName**: A character for the region name.
- **Guarantee**: A character string for the guarantee.
- **ClaimNb**: A numeric for the claim number.
- **AggClaim**: A numeric for the aggregate claim amount.
- **StateAb**: A character string for the abbreviated state name.

**Source**

The original dataset was provided in Chapter 5 of Charpentier (2014).

**References**


**Examples**

```r
# (1) load of data
#
data(braggclaim)
data(braggprem)
```
**brautocoll**

**Brazilian Automobile Collision Claims**

**Description**

Dataset of car traffic collisions that occurred in February 2011, in Belo Horizonte, a Brazilian city. A record consists of date, day, hour, locations (long, lat) and severity for a given collision.

**Usage**

data(brautocoll)

**Format**

brautocoll contains 5 columns:

- **Date**  The date of the traffic collision, see `Date`.
- **Day**  A character string for the weekday.
- **Hour**  Hour on the format hh:mm.
- **Lat**  Latitude of the location.
- **Long**  Longitude of the location.
- **Type**  A character string for the claim type.
- **Severity**  A character string for the severity.

**Source**

The original dataset was provided in Chapter 5 of Charpentier (2014).

**References**


**Examples**

```r
# (1) load of data
#
data(brautocoll)
dim(brautocoll)
```


**brgeomunic**

Brazilian geospatial dataset for municipalities

---

**Description**

*brgeomunic* is a spatial database containing geospatial information of Brazilian municipalities provided by IBGE, the Brazilian governmental agency in charge of geographical issues and official statistics (ibge.gov.br, accessed in February, 2013). *brgeomunic* is a geospatial dataframe of class `sp` based on three files: one containing the geographical coordinates of the polygons, lines or dots (55mu2500gsd.shp); another with attribute data (55mu2500gsd.dbf); a third file with the index that allows the connection between the .shp and .dbf files (55mu2500gsd.shx). As it is of class `sp`, *brgeomunic* can be easily plotted or summarized.

The final database is restricted to the municipalities from only four Brazilian states (Sao Paulo (SP), Santa Catarina (SC), Parana (PR), and Rio Grande do Sul (RS)). These states are located in the southern region of Brazil and contain almost 70 million inhabitants (around 36 percent of the Brazilian population) and constitute one of the richest regions of the country (approximately 60 percent of the Brazilian gross product).

*brgeomunicins* is also a geospatial dataframe of class `sp` combining a subset of *brgeomunic* (1833 cities out of 5566) and insurance statistic information. The insurance information comes from one large actuarial database provided by SUSEP, the agency responsible for the regulation and supervision of the Brazilian insurance, private pension, annuity, and reinsurance markets. SUSEP releases biannually a car insurance database composed of the aggregation of all insurance companies’ information. Due to confidentiality concerns, there is no individual-level information, the data being aggregated into zip code areas. Originally, both SUSEP and IBGE databases did not present a unique identification column that provides a forward merge of the two databases. The joint information is the name and the state of each municipality.

Insurance information have been selected to compare premiums, claims, and reported damages for two specific groups: popular vehicles and luxury vehicles. The basic difference between the groups is the power of the engine and the materials and finishing quality. Popular cars have a power of 1,000 cc (cylinders), whereas luxury cars usually have a power of 2,000 cc or greater. Popular cars are thus affordable to most customers.

The *Pop* group contains the following selected popular vehicles: Celta 1.0 (Chevrolet), Corsa 1.0 (Chevrolet), Prisma 1.0 (Chevrolet), Uno 1.0 (Fiat), Palio 1.0 (Fiat), Gol 1. (Volkswagen), Fox 1.0 (Volkswagen), Fiesta 1.0 (Ford), and Ka 1.0 (Ford).

The *Lux* group contains the following selected luxury vehicles: Vectra (Chevrolet), Omega (Chevrolet), Linea (Fiat), Bravo (Fiat), Passat (Volkswagen), Polo (Volkswagen), Fusion (Ford), Focus (Ford), Corolla (Toyota), Civic (Honda), and Audi.

In summary, *brgeomunicins@data* is a dataframe with detailed information of region, city code, yearly exposure, premium, and frequency of claims for the following categories: robbery or theft (Rob), partial collision and total loss (Coll), fire (Fire), or others (Other).

In addition to insurance statistics, the final dataframe *brgeomunicins@data* also includes the municipality population (CityDens10) based on the 2010 Census, and the 2000 municipality Human Development Index (HDIcity00). The Human Development Index (HDI) is a summary measure of long-term progress in three basic dimensions of human development: income, education, and health. The HDI provides a counterpoint to another widely used indicator, the Gross Domestic Product (GDP) per capita, which only considers economic dimensions. Both CityDens10 and HDIcity00 columns were generated from the IBGE site (ibge.gov.br, accessed February 2013).
Usage

data(brgeomunic)
data(brgeomunicins)

Format

brgeomunic@data contains 1 column:

CityCode A character string for the severity.

brgeomunicins@data contains 18 columns:

CityCode A character string for the severity.
State, StateAb Character string ("factor") for the full state name and the two-letter abbreviated state name.
City A character string ("factor") for the cityname.
PopExpo, LuxExpo The sum of exposure periods for policies in the Pop and the Lux groups, in years.
PopPrem, LuxPrem Gross written premium for the Pop and the Lux groups, respectively.
PopClaimRob, LuxClaimRob Aggregate robbery claim number for the Pop and the Lux groups, respectively.
PopClaimColl, LuxClaimColl Aggregate collision claim number for the Pop and the Lux groups, respectively.
PopClaimFire, LuxClaimFire Aggregate fire claim number for the Pop and the Lux groups, respectively.
PopClaimOther, LuxClaimOther Aggregate other claim number for the Pop and the Lux groups, respectively.
HDIcity00 A numeric for the HDI index of the city.
CityDens10 A numeric for the population density.

Source

The original dataset was provided in Chapter 5 of Charpentier (2014).

References


See Also

See the *sp* class.

Examples

```r
# (1) load of data
#
data(brgeomunicins)
str(brgeomunicins@data)

## Not run:
```
## Two Brazilian datasets for vehicle insurance

*brvehins1*'s, *brvehins2*'s are dataframes containing policy data based on the AUTOSEG (an acronym for Statistical System for Automobiles) and can be accessed online ([www2.susep.gov.br/menuestatistica/Autoseg](http://www2.susep.gov.br/menuestatistica/Autoseg), accessed February 2013). Each record includes risk features, claim amount and claim history for year 2011. The dataset *brvehins1* of 1,965,355 vehicle insurance policies has been split (randomly) in five datasets of 393,071 policies: *brvehins1a*, *brvehins1b*, *brvehins1c*, *brvehins1d*, *brvehins1e*. The dataset *brvehins2* of 2,667,752 policies has also been split (randomly) in four datasets of 666,938 policies: *brvehins2a*, *brvehins2b*, *brvehins2c*, *brvehins2d*.

### Description

*brvehins1* and *brvehins2* contain the following columns:

- **Gender**: A character string ("factor") for the gender (also indicate corporate policies).
- **DrivAge**: A character string ("factor") for the driver age group.
- **VehYear**: A numeric for the vehicle year.
- **FullVehCode**: A character string ("factor") for the full vehicle code.
- **VehCode**: A character string ("factor") for the vehicle group.
- **Area**: Local area name ("factor").

### Usage

```r
data(brvehins1a)
data(brvehins1b)
data(brvehins1c)
data(brvehins1d)
data(brvehins1e)
data(brvehins2a)
data(brvehins2b)
data(brvehins2c)
data(brvehins2d)
```
brvehins2’s contains 18 columns:

- **VehYear**: A numeric for the vehicle year.
- **FullVehCode**: A character string ("factor") for the full vehicle code.
- **VehCode**: A character string ("factor") for the vehicle group.
- **City**: A character string ("factor") for the city name.
- **CityCode**: A numeric for the city code.
- **Area**: Local area name ("factor").
- **State**: A character string ("factor") for the state name.
- **StateAb**: Abbreviated state name ("factor").
- **ExposTotal**: Total exposure
- **PremTotal**: Total premium.
- **ClaimNbRob,ClaimNbPartColl,ClaimNbTotColl,ClaimNbFire,ClaimNbOther**: Number of claims during the exposure period, respectively for robbery, partial collision, total collision, fire and other guarantees.
- **ClaimAmountRob,ClaimAmountPartColl,ClaimAmountTotColl,ClaimAmountFire,ClaimAmountOther**: Claim amounts during the exposure period, respectively for robbery, partial collision, total collision, fire and other guarantees.

Source

[www2.susep.gov.br/menuestatistica/Autoseg](http://www2.susep.gov.br/menuestatistica/Autoseg)

Examples

```r
## Not run:

# (1) load of data
#
data(brvehins1a)
dim(brvehins1a)
sapply(brvehins1a, class)
str(brvehins1a)
data(brvehins2a)
```
canlifins

```r
dim(brvehins2a)
sapply(brvehins2a, class)
str(brvehins2a)
```

## End(Not run)

canlifins  

**Canadian life insurance**

### Description

This dataset contains information of 14,889 contracts in force with a large Canadian insurer over the period December 29, 1988 through December 31, 1993. These contracts are joint and last-survivor annuities that were in the payout status over the observation period. For each contract, we have the date of birth, date of death (if applicable) and sex of each annuitant.

### Usage

```r
data(canlifins)
```

### Format

Data is a data frame of 5 columns and 14,889 rows:

- `EntryAgeM`: Entry age of the male.
- `EntryAgeF`: Entry age of the female.
- `DeathTimeM`: Time of death of the male (zero if not applicable).
- `DeathTimeF`: Time of death of the female (zero if not applicable).
- `AnnuityExpiredM`: The date that the annuity guarantee expired (if applicable).

Originally in Frees et al. (1995), the dataset contains 22 contracts where both annuitants are male, 36 contracts where both annuitants are female, in addition to 14,889 contracts where one annuitant is male and the other female (so a total of 14,947 contracts).

### Source

Unknown private insurer.

### References

Examples

```r
# (1) load of data
#
data(canlifins)
dim(canlifins)

# (2) Table 1 of Frees et al. (1995)
#

table(Age=cut(canlifins$EntryAgeM, c(0, 60, 70, 80, 120)),
      Status=cut(canlifins$DeathTimeM, c(-1, 0, 10)))
table(Age=cut(canlifins$EntryAgeF, c(0, 60, 70, 80, 120)),
      Status=cut(canlifins$DeathTimeF, c(-1, 0, 10)))
```

---

**CASdatasets**

**CASdatasets package**

---

**Description**

Actuarial Datasets (originally for the 'Computational Actuarial Science with R' book)

**Details**

This package contains the following datasets

- **Australia:**
  - `auscathist`: Historical disaster statistics in Australia.
  - `ausNLHYCapAdeq`, `ausNLHYFinPerf`, `ausNLHYFinPos`, `ausNLHYLiability`,
    `ausNLHYOffProf`, `ausNLHYOpIncExp`, `ausNLHYPremClaim`, `ausNLHYPrivInsur`,
    `ausNLHYPubInsur`, `ausNLHYRecAASB`, `ausNLHYReserve`: Australian Market - non-life insurance (aggregate level).
  - `ausNLHYCapAdeqByComp`, `ausNLHYClaimByState`, `ausNLHYFinPerfByComp`,
    `ausNLHYFinPerfPublic`, `ausNLHYFinPosByComp`, `ausNLHYFinPosPublic`,
    `ausNLHYOpIncExpPublic`, `ausNLHYPremByState`,
    `ausNLHYPremClaimPublic`, `ausNLHYPrivInsur`, `ausNLHYPubInsur`: Australian Market - non-life insurance (company, state, public level).
  - `ausNLHYLloydAsset`, `ausNLHYLloydGPI`, `ausNLHYLloydUWAcc`,
    `ausNLHYLloydUWRes`: Lloyds Market in Australia.
  - `austriLoB`: Australian claim triangles.
  - `ausprivauto`: Australian private motor datasets (by policy).
  - `ausNSW`: New South Wales statistics.

- **Belgium:**
  - `beaonre`: AON Re Belgium dataset.
  - `besecura`: Secura Re Belgium dataset.

- **Brazil:**
- **brgeomunic**: a geospatial dataset of Brazilian cities.
- **brgeomunicins**: a geospatial dataset of Brazilian cities with insurance indicators (exposure, claim frequency and premium).
- **brautocoll**: a Brazilian dataset of auto collision in Belo Horizonte during one month (categorical claim severity).
- **bragg**: aggregate Brazilian dataset per region.
- **brvehins1**: a Brazilian vehicle insurance datasets (by policy) with risk features except City.
- **brvehins2**: a Brazilian vehicle insurance datasets (by policy) with risk features including City.

* Canada:
  - **canlifins**: A portfolio of a Canadian life insurer.

* Danemark:
  - **danishuni, danishmulti**: Danish reinsurance claim dataset.

* European Union:
  - **eudirectlapse**: lapse dataset.

* France:
  - **freaggnumber**: a French aggregate claim number dataset.
  - **frebilloss**: French business interruption losses.
  - **freclaimset, freclaimset2**: French claim settlements.
  - **frecomfire**: French commercial fire losses.
  - **freDisTables**: French disability tables.
  - **fremarine**: French marine claim dataset (by policy).
  - **fremorttables**: French mortality tables.
  - **fremotorclaim**: French private motor claim datasets (by policy).
  - **freMTPL**: two French Motor-TPL claim datasets (by policy).
  - **freMPL**: a collection of ten French Motor personal line datasets (by policy).
  - **freportfolio**: fictive mortality tables and French nation-wide corresponding tables; two disability datasets from a French insurer.
  - **fre4LobTriangles**: A collection of triangles for 4 line of business from a private insurer.
  - **pricingame**: Datasets of Pricing Games of the French institute of Actuaries.

* Germany:
  - **credit**: A German Credit dataset.

* Italy:
  - **itamtplcost**: Large losses of an Italian Motor-TPL company.

* New Zealand:
  - **nzcathist**: Historical disaster statistics in New Zealand.

* Norway:
  - **norauto**: Norwegian automobile dataset.
  - **norfire**: Norwegian fire dataset.
  - **Norberg**: Norberg’s credibility dataset.
  - **nortritpl8800**: Norwegian claim triangle.

* Singapore:
  - **sgautonb**: Singapore Automobile claim count dataset.
— **sgtriangles**: Singapore Property and Casualty triangles.

- **Sweden:**
  - **swautoins**: Swedish Motor Insurance dataset
  - **swbusscase**: Swedish Buss Insurance dataset
  - **swmotorcycle**: Swedish Motorcycle Insurance dataset

- **United Kingdom:**
  - **ukaggclaim**: United Kingdom Car Insurance Claims.
  - **ukautocoll**: United Kingdom Car Collision Insurance Claims.

- **United States of America:**
  - **Davis**: Davis height-weight dataset.
  - **ICB1, ICB2**: Insurance Company Benchmarks.
  - **lossalae, lossalaefull**: General Third Part-liability claims and expenses.
  - **SOAGMI**: SOA Group Medical Insurance dataset.
  - **usautoBI**: Automobile Bodily Injuries in US.
  - **usautotriangles**: US automobile triangles.
  - **usexpanse**: US expense dataset.
  - **usGLtriangles**: US Property and Casualty triangles.
  - **ushurrainc, ushustormloss4980**: Historical hurricane statistics in United States of America.
  - **uslapseagent**: US lapse dataset from tied-agent channel.
  - **usmassBI**: US Massachusetts Automobile bodily injury claim datasets.
  - **usmedclaim**: US medical claim triangle.
  - **usprivautoclaim**: private automobile claims.
  - **usquakeLR**: California earthquake loss ratios.
  - **ustermllife**: Term life insurance survey.
  - **uswarrantaggnum**: US warranty automobile.
  - **usworkcomp**: US workers compensation datasets.

- **Misc.**:
  - **eqlist**: Earthquake list.
  - **hurricanehist**: Hurricane history.
  - **PnCdemand**: Property and Casualty demand.
  - **spacedata**: Space dataset.
  - **ECBYieldCurve, FedYieldCurve**: Yield curve for eurozone and US.
  - **forexUSUK**: Foreign exchange rate between USD and GBP.

Here is a list of datasets whose name has changed compared to the book ‘Computational Actuarial Science with R’:

**Chapter 1**: extreme2datasince1899 is **hurricanehist**.
**Chapter 5**: accidents and accidents_data are merged in **brautocoll**; 55mu2500gsd is **brgeomunic**;
  sul_sp, sul+sp_shape are stored in **brgeomunicins**;
**Chapter 9**: MyPortfolio is **freprojxINSEE**.
**Chapter 10**: DataMortality is **freptfpermdis**.
**Chapter 11**: DEXUSUK is **forexUSUK**.
**Chapter 14**: CONTRACTS is **freMTPLfreq**; CLAIMS is **freMTPLsev**.
**Chapter 15**: AutoClaimData is **usmassBI2**.
Description

This dataset contains information of 1,000 credit records. It is a consumer credit file, called the German Credit dataset in Tuff'ery (2011) and Nisbet et al. (2011). New applicants for credit and loans can be evaluated as good or bad payers using 21 explanatory variables.

Usage

data(credit)

Format

credit is a data frame of 21 columns and 1,000 rows:

- checking_status: Status of existing checking account, A11: less than 0, A12: from 0 to 200, A13: more than 200, and A14: no running account (or unknown).
- duration: Credit duration in months.
- credit_history: Credit history, A30: delay in paying off in the past, A31: critical account, A32: no credits taken or all credits paid back duly, A33: existing credits paid back duly till now, A34: all credits at this bank paid back duly.
- credit_amount: Credit amount in Deutsch marks.
- savings: Saving account, A61: less than 100, A62: from 100 to 500, A63: from 500 to 1,000, A64: more than 1,000, A65: no savings account (or unknown).
- employment: Present employment since, A71: unemployed, A72: less than 1 year, A73: from 1 to 4 years, A74: from 4 to 7 years, A75: more than 7 years.
- other_parties: Other debtors or guarantors, A101: none, A102: co-applicant, A103: guarantor.
- residence_since: Present residence since, A71: less than 1 year, A73: from 1 to 4 years, A74: from 4 to 7 years, A75: more than 7 years.
- property_magnitude: Property (most valuable), A121: real estate (ownership of house or land), A122: savings contract with a building society / Life insurance, A123: car or other, A124: unknown / no property.
- age: Age (in years).
other_payment_plans Other installment plans: A141: at other bank, A142: at department store or mail order house, A143: no further running credits.


existing_credits Number of existing credits at this bank (including the running one) A161: one, A162: two or three, A163: four or five, A164: six or more.


num_dependents Number of people being liable to provide maintenance for A181: zero to two, A182: three and more.

telephone Telephone: A191: none, A192: yes, registered under the customers name.


class binary variable 0 stands for good and 1 bad (or credit-worthy against not credit-worthy, or no non-payments against existing non-payments).

### Source

The original data was provided by:

Professor Dr. Hans Hofmann, Institut fuer Statistik und Oekonometrie, Universitaet Hamburg, FB Wirtschaftswissenschaften, Von-Melle-Park 5, 2000 Hamburg 13

Professor Dr. Hans Hofmann, Institut fuer Statistik und Oekonometrie, Universitaet Hamburg, FB Wirtschaftswissenschaften, Von-Melle-Park 5, 2000 Hamburg 13

The dataset has been taken from the UCI Repository Of Machine Learning Databases at [http://archive.ics.uci.edu/ml/datasets/Statlog+(German+Credit+Data)](http://archive.ics.uci.edu/ml/datasets/Statlog+(German+Credit+Data))

It is also available at [http://www.stat.uni-muenchen.de/service/datenarchiv/kredit/kreditvar_e.html](http://www.stat.uni-muenchen.de/service/datenarchiv/kredit/kreditvar_e.html)

### References


### See Also

For a good variable description, see also [http://www.stat.uni-muenchen.de/service/datenarchiv/kredit/kreditvar_e.html](http://www.stat.uni-muenchen.de/service/datenarchiv/kredit/kreditvar_e.html) and [http://archive.ics.uci.edu/ml/datasets/Statlog+(German+Credit+Data)](http://archive.ics.uci.edu/ml/datasets/Statlog+(German+Credit+Data)).

### Examples

```r
# (1) load of data
#
data(credit)
dim(credit)
```
Danish reinsurance claim dataset

Description

The univariate dataset was collected at Copenhagen Reinsurance and comprise 2167 fire losses over the period 1980 to 1990. They have been adjusted for inflation to reflect 1985 values and are expressed in millions of Danish Krone.

The multivariate dataset is the same data as above but the total claim has been divided into a building loss, a loss of contents and a loss of profits.

Usage

data(danishuni)
data(danishmulti)

Format

danishuni contains two columns:

Date  The day of claim occurrence.
Loss  The total loss amount in millions of Danish Krone (DKK).

danishmulti contains five columns:

Date  The day of claim occurrence.
Building  The loss amount (mDKK) of the building coverage.
Contents  The loss amount (mDKK) of the contents coverage.
Profits  The loss amount (mDKK) of the profit coverage.
Total  The total loss amount (mDKK).

All columns are numeric except Date columns of class Date.

Source


References

Examples

```r
# (1) load of data
#
data(danishuni)

# (2) plot and description of data
#
plot(danishuni$Loss)

# (3) load of data
#
data(danishmulti)

# (4) plot and description of data
#
idx <- sample(1:NROW(danishmulti), 10)
barplot(danishmulti$Building[idx], col="grey25",
        ylim=c(0, max(danishmulti$Total[idx])), main="Some claims of danish dataset")
barplot(danishmulti$Content[idx], add=TRUE, col="grey50", axes=FALSE)
barplot(danishmulti$Profits[idx], add=TRUE, col="grey75", axes=FALSE)
legend("topleft", legend=c("Building", "Content", "Profits"), fill=c("grey25",
                        "grey50", "grey75"))
```

---

**Davis**

*Davis dataset*

**Description**

This dataset contains information of 200 individuals.

**Usage**

```r
data(Davis)
```

**Format**

Data is a data frame of 5 columns and 200 rows:

- **sex** a factor: M for male and F for female.
- **weight** a numeric for the weight in Kg.
- **height** a numeric for the height in cm.
- **reportedWeight** a numeric for the weight in Kg.
- **reportedHeight** a numeric for the height in cm.

**Source**

References


Examples

```r
# (1) load of data
#
data(Davis)
dim(Davis)
head(Davis)
```

ECBYieldCurve

| EECBYieldCurve | Yield curve data spot rate, AAA-rated bonds, maturities from 3 months to 30 years |

Description

Government bond, nominal, all triple A issuer companies. The maturities are 3 and 6 months and from 1 year to 30 years with frequency business day, provided by European Central Bank. The range date is from 2006-12-29 to 2009-07-24.

Usage

```r
data(ECBYieldCurve)
```

Format

It is an xts object with 32 interest rate at different maturities and 655 observations.

Source


eqlist

| eqlist | Earthquake list |

Description

This dataset contains a list of all earthquakes of magnitude greater than 6 between 1900 and 2014.

Usage

```r
data(eqlist)
```
eqlist is a data frame of 16 columns and 1,698 rows:

- time  A factor for the time.
- latitude  A numeric for the latitude.
- longitude  A numeric for the longitude.
- depth  A numeric for the depth.
- mag  A numeric for the magnitude.
- magType  A factor for the magnitude type.
- nst  An integer for nst.
- gap  A numeric for the gap.
- dmin  A numeric for dmin.
- rms  A numeric for rms.
- net  A factor for the network.
- id  A factor for the identification number.
- updated  A factor for the last update.
- place  A factor for the place.
- type  A factor for the type.
- day  A date for the day.

Source


References


See Also

Northern California earthquake archive: [http://quake.geo.berkeley.edu/ncedc/catalog-search.html](http://quake.geo.berkeley.edu/ncedc/catalog-search.html)

Examples

```r
# (1) load of data
#
data(eqlist)
dim(eqlist)
plot(eqlist$day[eqlist$mag > 6.5], eqlist$mag[eqlist$mag > 6.5], pch=".",
xlab="Year", ylab="Magnitude", main="Earthquake above 6.5 mag (worldwide)")
```
eudirectlapse

European lapse dataset from the direct channel

Description

The eudirectlapse dataset is based on one-year vehicle insurance renewal quotes for an unknown year and an unknown insurer. There are 23,060 policies.

Usage

data(eudirectlapse)

Format

eudirectlapse is a data frame of 19 columns and 23,060 rows:

lapse  A binary variable indicating the lapse of the customer.

polholder_age  The age of the policyholder.

polholder_BMCevol  The evolution of bonus/malus coefficient (BMC) of the policyholder: 3 categorical values ("down" when bonus increases, "stable" when coefficient does not change, "up" when malus increases.

polholder_diffdriver  The difference status between the policyholder and the driver.

polholder_gender  The gender of the policyholder.

polholder_job  The job of the policyholder: either "medical" or "normal".

policy_age  The age of the policy.

policy_caruse  The car usage.

policy_nbcontract  The number of policies given policyholder for this insurer.

prem_final  The final renewal premium value proposed to policyholder.

prem_freqperyear  The premium frequency per year.

prem_last  The premium paid by the policyholder for the last insurance coverage.

prem_market  A proxy of the market premium.

prem_pure  The technical premium value.

vehicl_age  The vehicle age.

vehicl_agepurchase  The vehicle age at purchase.

vehicl_garage  The garage type (categorical values).

vehicl_powerkw  The horsepower of the car (categorical values).

vehicl_region  The living region of policyholder (unknown category).

Source

Unknown non-life insurers from European Union.
Examples

# (1) load of data
#
data(eudirectlapse)
head(eudirectlapse)

---

**FedYieldCurve**  
*Federal Reserve interest rates*

**Description**

The data-set contains the interest rates of the Federal Reserve, from January 1982 to December 2012. The interest rates are Market yield on U.S. Treasury securities constant maturity (CMT) (more information on the Treasury yield curve can be found at the following website [http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/yieldmethod.aspx](http://www.treasury.gov/resource-center/data-chart-center/interest-rates/Pages/yieldmethod.aspx)) at different maturities (3 months, 6 months, 1 year, 2 years, 3 years, 5 years, 7 years and 10 years), quoted on investment basis and have been gathered with monthly frequency.

**Usage**

data(FedYieldCurve)

**Format**

An object with class attributes `xts`.

**Source**


---

**forexUSUK**  
*Foreign exchange rate between USD and GBP*

**Description**

The dataset is the daily buying rates in New York City for cable transfers payable in foreign currencies from January 4, 1971 to March 1, 2013. The data can be downloaded from the FRED website. Access to this website was done on March 6, 2012.

**Usage**

data(forexUSUK)
Fre4LoBtriangles

Format

ForexUSUK is a data frame of 2 columns and 10,583 rows:

Date  Date.
Value  The index value.

Source


References


Examples

```r
# (1) load of data
#
data(forexUSUK)
dim(forexUSUK)
head(forexUSUK)

# (2) plot of data
#
forexUSUK <- forexUSUK[forexUSUK$Date >= "2012-01-01", ]
plot(forexUSUK$Date, forexUSUK$Value, main = "US/UK FX Rate",
     xlab = "Year", ylab = "Index", type = "l")
```

fre4LoBtriangles  French private motor triangles

Description


For each dataset, the variable fretri--- is a list of 3 elements for the damage guarantee, the body guarantee and the total. Each element is also a list of two elements with paid claims and incurred claim amounts. Note that claim amounts are cumulated.
Usage

#1st Line of Business
data(fretri1auto9605)

#2nd Line of Business
data(fretri2auto9605)

#3rd Line of Business
data(fretri3auto9605)

#4th Line of Business
data(fretri4auto9403)

Format

fretriXautoYYZZ contains the insurance triangle for Xth line of business from year YY to year ZZ.

Source

Unknown private insurer

Examples

# (1) load of data
#
#

#1st Line of Business
data(fretri1auto9605)

#2nd Line of Business
data(fretri2auto9605)

#3rd Line of Business
data(fretri3auto9605)

#4th Line of Business
data(fretri4auto9403)

Description

The dataset consists of 12513 classes for which we have the driver age, the age of driving licence, the vehicle age, the exposure and the claim number.
frebiloss

Usage
data(freaggnumber)

Format
danishuni contains 5 columns:

DriverAge  The driver age.
LicenceAge  The age at which the driver gets its driving licence.
VehAge  The vehicle age.
Exposure  The exposure (in policy-year).
ClaimNumber  The claim number for that group.

Examples

# (1) load of data
#
data(freaggnnumber)
dim(freaggnnumber)

# (2) ecdf plot
#
summary(freaggnumber$ClaimNumber / freaggnumber$Exposure)

Description
The univariate dataset was collected at FFSA and comprise 2387 business interruption losses over the period 1985 to 2000 (for losses above 100,000 French Francs).

Usage
data(freibiloss)

Format
danishuni contains 8 columns:

Year  The year of claim occurrence.
OccurDate  The day of claim occurrence.
PolicyID  The policy identification number.
ClaimID  The claim identification number.
ClaimCost  Original claim cost in French Francs (FFR).
TotalCost  Original total cost (claim+expense) in French Francs.
freclaimset

Source

FFSA

References


Examples

```r
# (1) load of data
#
data(frebiloss)
dim(frebiloss)

# (2) ecdf plot
#
plot(ecdf(frebiloss$ClaimCost2007), log="x", xlim=c(10^1, 10^5))
boxplot(ClaimCost2007~Year, data=frebiloss, log="y")
```

---

freclaimset  
*French claim settlements*

Description

The dataset consists of 2306 claims settlements between 1996 and 2006.

Usage

data(freclaimset)

Format

*freclaimset* contains 6 columns:

- **PaymentDate**: The payment date.
- **Payment**: The amount of money paid.
- **FbFprov**: The file-by-file provision.
- **Risk**: The risk category.
- **Subrisk**: The sub-category.
- **Type**: The risk type.

Source

Unknown private insurer
Examples

# (1) load of data
#
data(freclaimset)
dim(freclaimset)

Description

The dataset consists of claims settlements of the damage guarantee of a French insurer for motor insurance between 1995 and 2014. 1,012,839 records for 735,079 claims are listed in the dataset in conjunction with some aggregated data (exposure, GWP, claim number) per occurrence year.

`freclaimset2motor` and `freclaimset3fire9207` and `freclaimset3dam9207` consist of randomized claims settlements of the fire/damage guarantee of a French insurer for corporate insurance between 1992 and 2007. 58,056 claims are listed in the dataset for which both paid and incurred (F/F) amounts (EUR) are available.

Usage

data(freclaimset2motor)
data(freclaimset3fire9207)
data(freclaimset3dam9207)

Format

`freclaimset2motor` is a list of two components. `freclaimset2motor$claimset` contains 8 columns:

- **ClaimID**: The identification number of the claim, first four characters are the occurrence year.
- **OccurYear**: The occurrence year.
- **ManagYear**: The management year.
- **ClaimStatus**: A character string for the claim status.
- **PaidAmount**: The cumulative paid amount for the claim (euro).
- **RecourseAmount**: The cumulative paid recourse for the claim (euro).
- **ExpectCharge**: The expected amount for the claim (euro).
- **ExpectRecourse**: The expected recourse for the claim (euro).

`freclaimset2motor$claimset` contains 4 columns:

- **Year**: The management year.
- **Exposure**: The sum of insurance years of the portfolio.
- **GWP**: The gross written premium (in euro).
- **ClaimNb**: The Claim Number.

`freclaimset3fire9207` and `freclaimset3dam9207` are data frames with 37 columns:

- **NbEmployee**: The category of employee number.
The category of site number.

Surface  The insured surface.

RiskCateg  An unknown risk category.

\(\text{inc}_{\text{Y}i} - \text{inc}_{\text{Y}0}\) \(\text{inc}_{\text{Y}}\) is the incurred amount of the claim at the end of year 2007-\(j\), i.e. \(\text{inc}_{\text{Y}0}\) is the latest estimate and \(\text{inc}_{\text{Y}15}\) is the oldest estimate.

\(\text{paid}_{\text{Y}i} - \text{paid}_{\text{Y}0}\) \(\text{paid}_{\text{Y}}\) is the paid amount of the claim at the end of year 2007-\(j\), i.e. \(\text{paid}_{\text{Y}0}\) is the latest estimate and \(\text{paid}_{\text{Y}15}\) is the oldest estimate.

OccurDate  The occurence date. Note that \(\text{paid}_{\text{Y}}/\text{inc}_{\text{Y}}\) is never empty (i.e. NA) even if the claim did occur after the year 2007-\(j\).

### Source

Unknown private insurers

### Examples

```r
# (1) load of data
#
data(freclaimset2motor)
dim(freclaimset2motor)
data(freclaimset3fire9207)
data(freclaimset3dam9207)

# (2) consistency check (should be the same)
#
somerow <- freclaimset2motor$claimset$OccurYear == freclaimset2motor$claimset$ManagYear

cbind(
  freclaimset2motor$aggdata$ClaimNb,
table(freclaimset2motor$claimset[somerow, "OccurYear"])
)

# (3) some examples of claims
#
subset(freclaimset2motor$claimset, ClaimID == "1995-000127")
subset(freclaimset2motor$claimset, ClaimID == "1996-008979")

head(freclaimset3fire9207)
tail(freclaimset3fire9207)
```

---

**frecomfire**  
*French commercial fire losses*

### Description

The univariate dataset was collected at FFSA and comprise 9613 commercial fire losses over the period 1982 to 1996.
Usage

```r
data(frecomfire)
```

Format

`frecomfire` contains 4 columns:

- **Year**: The year of claim occurrence.
- **OccurDate**: The day of claim occurrence.
- **ClaimCost**: Original claim cost in French Francs (FFR).
- **ClaimCost2007**: Normed claim cost in thousand of 2007 euros (EUR).

Source

FFSA

Examples

```r
# (1) load of data
#
data(frecomfire)
dim(frecomfire)
```

<table>
<thead>
<tr>
<th>freDisTables</th>
<th>French Disability Tables and Probabilities</th>
</tr>
</thead>
</table>

Description

Naming convention: \(X2Y\) stands for going from state \(X\) to state \(Y\), where possible states are \(T\) (temporary disability), \(P\) (permanent disability), \(D\) (death). For instance, \(T2T\) stands for temporary to temporary disability.

Tables `freP2Pdis10`, `freT2Tdis10` and `freT2Pdis10` have been established by the French mutual (BCAC) under a mission mandated by the French association of insurance companies (FFSA) and imposed by the new retirement reglementation after an agreement of professional federations. These tables have been build in 1993 and extended to the age 62 in 2010 by the December 24 act in 2010, cf. JO (2010).

These tables have been entirely rebuilt in 2013 by BCAC: the new imposed tables are Tables `freP2Pdis13`, `freT2Tdis13` and `freT2Pdis13`, see Bagui (2013).

`freP2Pdis10/freP2Pdis13` contain the continuation table of permanent disability (so-called invalidity in France) based on a 10,000-person reference population for all age between 20 and 61 (resp. between 20 and 64). `freT2Tdis10/freT2Tdis13` contain the continuation table of temporary disability (so-called incapacity in France) based on a 10,000-person reference population for all age between 20 and 66. (resp. between 21 and 65). `freT2Pdis10/freT2Pdis13` contain the transition table (from temporary to permanent disability) based on a 10,000-person reference population for all age between 20 and 61 (resp. between 21 and 62). Note that in France temporary disability is...
limited to 36 months (irrespective of the entry age) and permanent disability age is capped at the age of retirement 62 for 2010 tables (resp. 65 for 2013 tables).

\texttt{freT2Pdisprob10/freT2Pdisprob13,freT2Tdisprob10/freT2Tdisprob13,freP2Pdisprob10/freP2Pdisprob13} are the corresponding probabilities deduced from the tables, respectively to go from temporary to permanent disability, to stay temporarily disabled and to stay permanently disabled, given the entry age and the number of month or years already disabled.

Tables \texttt{freT2Ddis10,freP2Ddis10} have been established by the French mutual (BCAC) under a mission mandated by the French association of insurance companies (FFSA) and imposed by the new retirement regulation after an agreement of professional federations.

The \texttt{freP2Ddis10} contains the mortality table of permanent disability (so-called invalidity in France) based on a 10,000-person reference population for all age between 25 and 64. The \texttt{freT2Ddis10} contains the mortality table of temporary disability (so-called incapacity in France) based on a 10,000-person reference population for all age between 25 and 65.

\texttt{freP2Ddisprob10,freT2Ddisprob10} are the corresponding probabilities deduced from the tables, respectively to die from temporary disability, to die from permanent disability, given the entry age and the number of month or years already disabled.

**Usage**

\begin{verbatim}
data(freP2Pdis10) data(freT2Tdis10) data(freT2Pdis10) data(freP2Pdisprob10) data(freT2Tdisprob10) data(freT2Pdisprob10) data(freT2Ddis10) data(freP2Ddis10) data(freT2Ddisprob10) data(freP2Ddisprob10) data(freP2Pdis13) data(freT2Tdis13) data(freT2Pdis13) data(freP2Pdisprob13) data(freT2Tdisprob13) data(freT2Pdisprob13)
\end{verbatim}

**Format**

\texttt{freP2Pdis10/freP2Pdis13} contains 44 (resp. 47) columns:

- **EntryAge** The entry age in permanent disability.
- **NbYrSpent0,...,NbYrSpent42/NbYrSpent45** The number of people (among 10,000) who spent a certain number of years (0 to 42/45) in permanent disability.

\texttt{freP2Pdisprob10/freP2Pdisprob13} contains the probabilities to stay permanently disabled given the number of years spent in such a state.
freT2Tdis10/freT2Tdis13 contains 38 columns:

EntryAge  The entry age in permanent disability.
NbMthSpent0,...,NbMthSpent36  The number of people (among 10,000) who spent a certain number of months (0 to 36) in temporary disability.

freT2Tdisprob10/freT2Tdisprob13 contains in 36 columns from NbMthSpent0 to NbMthSpent35 the probabilities to stay temporarily disabled given the number of months spent in such a state.

freT2Pdis10/freT2Pdis13 contains 37 columns:

EntryAge  The entry age in permanent disability.
NbMthSpent0,...,NbMthSpent35  Transition probably from temporary to permanent disability after a certain number of months (0 to 35) spent in temporary disability.

freT2Pdisprob10/freT2Pdisprob13 contains in 36 columns from NbMthSpent0 to NbMthSpent35 the probabilities to become permanently disabled given the number of months spent in temporary disability.

freT2Ddis10 contains 37 columns:

EntryAge  The entry age in permanent disability.
NbMthSpent0,...,NbMthSpent35  The number of people (among 10,000) who spent a certain number of months (0 to 35) in temporary disability.

freT2Ddisprob10 contains in 36 columns the probabilities to die given the number of months spent in temporary disability.

freP2Ddis10 contains 37 columns:

EntryAge  The entry age in permanent disability.
NbYrSpent0,...,NbYrSpent35  The number of people (among 10,000) who spent a certain number of years (0 to 35) in permanent disability.

freP2Ddisprob10 contains in 36 columns the probabilities to die given the number of years spent in permanent disability.

Source

RessourcesActuarielles

References

(all ref. in French)
FFSA (2005), *Demande de donnees relatives aux populations d’assures*, Document de travail FFSA.
Planchet (2005), *Tables de mortalite d’experience pour des portefeuilles de rentiers*, Note methodologique de l’Institut des Actuaires.


Examples

```
# (1) load of data
#
data(freP2Pdis10)
data(freT2Tdis10)
data(freT2Pdis10)
data(freP2Pdisprob10)
data(freT2Tdisprob10)
data(freT2Pdisprob10)
data(freT2Odis10)
data(freP2Odis10)
data(freT2Odisprob10)
data(freP2Odisprob10)
data(freP2Pdis13)
data(freT2Tdis13)
data(freT2Pdis13)
data(freP2Pdisprob13)
data(freT2Tdisprob13)
data(freT2Pdisprob13)
```

**fredpt17**

*French geospatial dataset for departments*

Description

`fredpt17` is a spatial database containing geospatial information of French departments to be used with pricing actuarial games’ files, see `pricingame`. `fredpt17` is a geospatial dataframe of class `sp` based on six files: `DEPARTMENTS.cpg`, `DEPARTMENTS.dbf`, `DEPARTMENTS.prj`, `DEPARTMENTS.qpj`, `DEPARTMENTS.shp`, `DEPARTMENTS.shx`. As it is of class `sp`, `fredpt17` can be easily plotted or summarized.

Usage

```
data(fredpt17)
```

Format

`fredpt17@data` contains 1 column:

**DEPT** A factor for the department number.
freemarine

Source

See https://actinfo.hypotheses.org/86 for the third pricing game.

See Also

See the sp class.

Examples

```r
# (1) load of data
#
data(fredpt17)

names(fredpt17)
class(fredpt17)
length(fredpt17)
summary(fredpt17)
dim(fredpt17)

## Not run:
# (2) plot of data
#
plot(fredpt17)
spplot(fredpt17)

## End(Not run)
```

Description

The univariate dataset was collected by a French private insurer and comprise 1,274 marine losses between the January 2003 and June 2006. The status of the claim (settled or opened) is determined at the end of June 2006.

Usage

data(fremarine)

Format

`fremarine` contains 20 columns:

- **OccurDate** The day of claim occurrence.
ReportDate  The day of claim reporting.
ShipCateg  The category of the insured ship (factor).
ShipBrand  The brand of the insured ship (factor) (resampled).
ShipPower  The power of the insured ship (factor).
ShipEngNb  The engine number of the insured ship (factor).
ShipEngYear The engine year of the insured ship (factor) (resampled).
ShipBuildYear The building year of the insured ship (factor) (resampled).
ShipHull    The hull of the insured ship (factor) (resampled).
ShipLength  The length of the insured ship (factor).
ShipTonnage The tonnage of the insured ship (factor).
InsuredValue The insured value of the insured ship (factor).
ClaimPaid   The paid amount (EUR) of the claim (numeric) (rescaled and noisy).
ClaimCharge The charge amount (EUR) of the claim (numeric) (rescaled and noisy).
ClaimRecourse The recourse amount (EUR) of the claim (numeric) (rescaled and noisy).
ClaimStatus The status of the claim (factor) (resampled).
ClaimCateg  The category of the claim (unknown factor) (resampled).
Deductible  The deductible value (numeric) (rescaled and noisy).
HeadQuarter The city name of the ship headquarter (factor) (resampled).
Departement The corresponding French depatment of the cityname (factor).

Source

Unknown private insurer

Examples

# (1) load of data
#
data(fremarine)
dim(fremarine)

---

Description

The frePM6064 (resp. frePF6064) table has been established on INSEE observations collected between 1960 and 1964 in the French male population (resp. the French female population).

The freTD7377 (resp. freTV7377) table has been established on INSEE observations collected between 1973 and 1977 in the French male population (resp. the French female population). The table was officially approved by the August 22 act in 1986 and applies to life insurance.
The `freTD8890` (resp. `freTV8890`) table has been established on INSEE observations collected between 1988 and 1990 in the French male population (resp. the French female population). The table was officially approved by the April 27 act in 1993 and applies to life insurance.

The `freTPRV93` table is extracted from the floor table for pricing life annuities. The table was officially approved by the July 28 act in 1993 and is based on the prospective table tracking mortalities for generations between 1887 and 1993 (full table for generation 1950), JO (1993).

The `freTH0002` (resp. `freTF0002`) table has been established on INSEE observations collected in the French male population (resp. the French female population). The table was officially approved by the December 20 act in 2005 and applies to life insurance other than life annuities in conjunction with the table of age shifts `freAS0002`, JO (2005, 2006a, 2006b, 2006c).

The `freTGH05` (resp. `freTGF05`) table has been established based on 19 portfolios (16 from FFSA and 3 from CTIP) in the French male population (resp. the French female population) between 1993 and 2005. The underlying prospective INSEE table has been built on the basis of mortality tables between 1962 and 2000. The table was officially approved by the August 1 act in 2006. The `freTPG93full` table has been built for comparison with TGH05 and TGF05.

**Usage**

```r
data(frePM6064)
data(frePF6064)
data(freTD7377)
data(freTV7377)
data(freTD8890)
data(freTV8890)
data(freTPRV93)
data(freTPG93full)
data(freTF0002)
data(freTH0002)
data(freAS0002)
data(freTGH05)
data(freTGF05)
```

**Format**

`frePM6064`, `frePF6064`, `freTD7377`, `freTV7377`, `freTD8890`, `freTV8890`, `freTPRV93`, `freTF0002` and `freTH0002` contain 2 columns:

- x  The age x.
- lx  The number of people still alive at x among the initial 100,000 referenced people.

`freAS0002` contains 6 columns:

- LowerAgeF, LowerAgeH  The lower bound of the age class.
- UpperAgeF, UpperAgeH  The upper bound of the age class.
- ShiftF, ShiftH  The value to shift.

`freTGH05` and `freTGF05` contain 107 columns:
FreMortTables

The age $x$. 1900, ..., 2005 The number of people still alive at $x$ among the referenced people in year 1900 (etc.. 2005).

freTPG93full contains 95 columns:

- The age.
- 1900, ..., 1993 The number of people still alive at $x$ among the referenced people in year 1900 (etc.. 1993).

Source

INSEE, JO, RessourcesActuarielles

References

FFSA (2005), Demande de donnees relatives aux populations d’assures, Document de travail FFSA.

IA (2006), Notice d’utilisation des tables de mortalite TH0002 and TF0002, Note methodologique de l’Institut des Actuaires.


Planchet (2005), Tables de mortalite d’experience pour des portefeuilles de rentiers, Note methodologique de l’Institut des Actuaires.

Planchet (2006), Construction des tables de mortalite d’experience pour les portefeuilles de rentiers - presentation de la methode de construction, Note methodologique de l’Institut des Actuaires.

Serant (2005), Construction de tables prospectives de mortalite, Document interne FFSA (confidentiel).


Examples

# (1) load of data
#
data(frePM6064)
data(frePF6064)
data(freTD7377)
data(freTV7377)
data(freTD8890)
head(freTD8890)
data(freTV8890)
head(freTV8890)
Description

Datasets `fremotor1freq0304a/b/c`, `fremotor1sev0304a/b/c`, `fremotor1prem0304a/b/c` are nine datasets from the same database of an unknown private motor portfolio observed between January 2003 and December 2004, respectively claim frequency databases, claim severity databases and premium databases. The last letter `a`, `b` or `c` distinguishes the random sampling for a given dataset series. Note that some records are common between resampling versions.

Datasets `fremotor1freq0304a/b/c` consist of 64,234 records with explanatory variables for policies (possibly with multiple vehicles insured under the same policy number). Datasets `fremotor1prem0304a/b/c` consist of 51,949 records of claim numbers (by policy) in 2003 and 2004. Datasets `fremotor1sev0304a/b/c` consist of 9,246 records of ClaimAmount, their occurrence date, the corresponding guarantee, in 2003 and 2004.

Datasets `fremotor2sev9907`, `fremotor3sev9907`, `fremotor4sev9907`, and `fremotor2freq9907u`, `fremotor3freq9907u`, `fremotor4freq9907u`, `fremotor2freq9907b`, `fremotor3freq9907b`, `fremotor4freq9907b` are claim severities and claim frequencies coming from the same database for a private motor portfolio observed between 1999 and 2007. For size reason, the database has been splitted into three parts `fremotor2freq9907u`, `fremotor3freq9907u`, `fremotor4freq9907u`, and `fremotor2freq9907b`, `fremotor3freq9907b`, `fremotor4freq9907b`. Furthermore, the claim frequencies are available on two different formats: longitudinal unbalanced data and longitudinal balanced data, respectively `fremotor2freq9907u` and `fremotor2freq9907b`. The policy number is only available for claim frequencies: it is impossible to match claim severities and claim frequencies.

Usage

```r
data(fremotor1prem0304a)
data(fremotor1prem0304b)
data(fremotor1prem0304c)
```
data(fremotor1freq0304a)
data(fremotor1freq0304b)
data(fremotor1freq0304c)
data(fremotor1sev0304a)
data(fremotor1sev0304b)
data(fremotor1sev0304c)
data(fremotor2sev9907)
data(fremotor3sev9907)
data(fremotor4sev9907)
data(fremotor2freq9907u)
data(fremotor3freq9907u)
data(fremotor4freq9907u)
data(fremotor2freq9907b)
data(fremotor3freq9907b)
data(fremotor4freq9907b)

**Format**

_fremotor1prem0304a/b/c_ contain 30 columns:

- **IDpol** The policy ID (used to link with the claims dataset).
- **DrivAge** The driver age, in years (in France, people can drive a car at 18).
- **DrivGender** The gender (as "factor").
- **MaritalStatus** The marital status (as "factor").
- **BonusMalus** Bonus/malus, between 50 and 350: <100 means bonus, >100 means malus in France.
- **LicenceNb** The licence number (at least one).
- **PayFreq** The payment frequency (as "factor").
- **JobCode** The job code (as "factor").
- **VehAge** The vehicle age, in years.
- **VehClass** The vehicle class (as "factor").
- **VehPower** The vehicle power (as "factor") from least powerful "P2" to most powerful car "P15".
- **VehGas** The car gas, Diesel or regular (as "factor").
- **VehUsage** The vehicle usage (as "factor").
- **Garage** The type of garage (as "factor").
- **Area** The area code (as "factor"): unknown category.
- **Region** The policy regions in France (based on a standard French classification).
- **Channel** The channel distribution code (as "factor"): unknown category.
- **Marketing** The marketing code (as "factor"): unknown category.
- **PremWindscreen** The premium for windscreen guarantee (annual basis).
- **PremDamAll** The premium for damage all-accident guarantee (annual basis).
- **PremFire** The premium for fire guarantee (annual basis).
PremAcc1  The premium for type-1 accident guarantee (annual basis).
PremAcc2  The premium for type-2 accident guarantee (annual basis).
PremLegal  The premium for legal protection guarantee (annual basis).
PremTPLM  The premium for mandatory third-party liability guarantee (annual basis).
PremTPLV  The premium for voluntary third-party liability guarantee (annual basis).
PremServ  The premium for service guarantee (annual basis).
PremTheft  The premium for theft guarantee (annual basis).
PremTot  The total premium (annual basis).
Year  Numeric for the year.

fremotor1freq0304a/b/c contain 6 columns:
  IDpol  The policy ID.
  Year  The underwriting year.
  Damage  The claim number for the Damage guarantee.
  Fire  The claim number for the Fire guarantee.
  Other  The claim number for the Other guarantee.
  Theft  The claim number for the Theft guarantee.
  TPL  The claim number for the TPL guarantee.
  Windsreen  The claim number for the Windscreen guarantee.

fremotor1sev0304a/b/c contain 6 columns:
  IDpol  The policy ID.
  OccurDate  The occurrence date.
  Payment  The amount of money paid.
  IDclaim  The claim ID.
  Guarantee  The corresponding guarantee of the claim.

fremotor2sev9907, fremotor3sev9907, fremotor4sev9907 contains 3 columns:
  Year  The occurrence year.
  NbClaim  The number of claims aggregated, mostly 1.
  ClaimAmount  The aggregate charge (i.e. expected claim amount).

fremotor2freq9907u, fremotor3freq9907u, fremotor4freq9907u contains 23 columns:
  IDpol  The policy ID.
  Usage  The usage (unknown category).
  VehType  The vehicle type (unknown category).
  VehPower  The vehicle power (unknown category).
  NbYear  The number of years under exposure.
  NbClaimXXXX  The number of claims for year XXXX.
  ExpoXXXX  The exposure for year XXXX.

fremotor2freq9907b, fremotor3freq9907b, fremotor4freq9907b contains 7 columns:
  IDpol  The policy ID.
Year  The year.
NbClaim  The number of claims.
Expo  The exposure.
Usage  The usage (unknown category).
VehType  The vehicle type (unknown category).
VehPower  The vehicle power (unknown category).

Source
Unknown private insurer

Examples

```r
# (1) load of data
#
data(fremotor1prem0304a)
data(fremotor1prem0304b)
data(fremotor1prem0304c)
data(fremotor1freq0304a)
data(fremotor1freq0304b)
data(fremotor1freq0304c)
data(fremotor1sev0304a)
data(fremotor1sev0304b)
data(fremotor1sev0304c)

# gross written premium
tapply(fremotor1prem0304a$PremTot, fremotor1prem0304a$Year, sum)
```

```r
# (1) load of data
#
data(fremotor2sev9907)
data(fremotor3sev9907)
data(fremotor4sev9907)
data(fremotor2freq9907u)
data(fremotor3freq9907u)
data(fremotor4freq9907u)
data(fremotor2freq9907b)
data(fremotor3freq9907b)
data(fremotor4freq9907b)
```
**Description**

This collection of ten datasets comes from a private motor French insurer. Each dataset includes risk features, claim amount and claim history of around 30,000 policies for year 2004.

**Usage**

```r
data(freMPL1)
data(freMPL2)
data(freMPL3)
data(freMPL4)
data(freMPL5)
data(freMPL6)
data(freMPL7)
data(freMPL8)
data(freMPL9)
data(freMPL10)
```

**Format**

For this collection of dataset, possible variables are given below. `freMPL1–10` contains claim severity and frequency information. The following tabular gives the list of variables by file.

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</tr>
</tbody>
</table>
The comprehensive list of the variables (of all datasets) is given below, yet no dataset contains all these variables.

**VehAge** The vehicle age, in years.

**DrivAge** The driver age, in years (in France, people can drive a car at 18).

**LicAge** The driving licence age, in months.

**Gender** The gender, either "Male" or "Female".

**MariStat** The marital status, either "Alone" or "Other".

**SocioCateg** The social category known as CSP in France, between "CSP1" and "CSP99".

**VehUsage** The vehicle usage among "Private", "Private+trip to office" "Professional", "Professional run".

**Garage** The garage, if any, among "Collective garage", "None", "Private garage".

**HasKmLimit** A numeric, 1 if there is a km limit for the policy, 0 otherwise.

**BonusMalus** A numeric for the bonus/malus, between 50 and 350: <100 means bonus, >100 means malus in France.

**RecordBeg** Beginning date of record.

**RecordEnd** End date of record.

**Exposure** The exposure, in years.

**VehClass** The vehicle class (unknown categories), among "0", "A", "B", "H", "M1", "M2".

**VehBody** The vehicle body, among "bus", "cabriolet", "coupe", "microvan", "other microvan", "sedan", "sport utility vehicle", "station wagon", "van".

**VehEnergy** The vehicle energy, among "diesel", "electric", "GPL", "regular".

**VehEngine** The vehicle engine, among "carburation", "direct injection overpowered", "electric", "GPL", "injection", "injection overpowered".

**VehMaxSpeed** The VehMaxSpeed, among "1-130 km/h", "130-140 km/h", "140-150 km/h", "150-160 km/h", "160-170 km/h", "170-180 km/h", "180-190 km/h", "190-200 km/h", "200-220 km/h", "220+ km/h".

**RiskVar** Unknown risk variable between 1 and 20, possibly ordered.

**DeducType** Deductible type, among "Majorized", "Normal", "Partially refunded", "Proportional", "Refunded".

**RiskArea** Unknown risk area between 1 and 13, possibly ordered.

**ClaimNbResp** Number of responsible claims in the 4 preceding years.

**ClaimNbNonResp** Number of non-responsible claims in the 4 preceding years.

**ClaimNbParking** Number of parking claims in the 4 preceding years.

**ClaimNbFireTheft** Number of fire-theft claims in the 4 preceding years.

**ClaimNbWindscreen** Number of windscreen claims in the 4 preceding years.

**OutUseNb** Number of out-of-use in the 4 preceding years.

**ClaimAmount** Total claim amount of the guarantee.

**ClaimInd** Claim indicator of the guarantee. (this is not the claim number)
**Source**

Unknown French private insurer.

**See Also**

For the vehicle body variable, see [https://en.wikipedia.org/wiki/Car_classification](https://en.wikipedia.org/wiki/Car_classification)

**Examples**

```r
# (1) load of data
#
data(freMPL1)
data(freMPL2)
data(freMPL3)
data(freMPL4)
data(freMPL5)
data(freMPL6)
data(freMPL7)
data(freMPL8)
data(freMPL9)
data(freMPL10)
```

### freMPL

*French Motor Third-Part Liability datasets*

**Description**

In the two datasets `freMPLfreq`, `freMPLsev`, risk features are collected for 413,169 motor third-party liability policies (observed mostly on one year). In addition, we have claim numbers by policy as well as the corresponding claim amounts. `freMPLfreq` contains the risk features and the claim number while `freMPLsev` contains the claim amount and the corresponding policy ID.

In the two datasets `freMTPL2freq`, `freMTPL2sev`, risk features are collected for 677,991 motor third-party liability policies (observed mostly on one year). In addition, we have claim numbers by policy as well as the corresponding claim amounts. `freMTPL2freq` contains the risk features and the claim number while `freMTPL2sev` contains the claim amount and the corresponding policy ID.

**Usage**

```r
data(freMPLfreq)
data(freMPLsev)
data(freMTPL2freq)
data(freMTPL2sev)
```
Format

freMTPLfreq contains 10 columns:

PolicyID The policy ID (used to link with the claims dataset).
ClaimNb Number of claims during the exposure period.
Exposure The period of exposure for a policy, in years.
Power The power of the car (ordered categorical).
CarAge The vehicle age, in years.
DriverAge The driver age, in years (in France, people can drive a car at 18).
Brand The car brand divided in the following groups: A- Renault Nissan and Citroen, B-Volkswagen, Audi, Skoda and Seat, C-Opel, General Motors and Ford, D-Fiat, E-Mercedes Chrysler and BMW, F-Japanese (except Nissan) and Korean, G-other.
Gas The car gas, Diesel or regular.
Region The policy region in France (based on the 1970-2015 classification).
Density The density of inhabitants (number of inhabitants per km2) in the city the driver of the car lives in.

freMTPLsev contains 2 columns:

PolicyID The occurrence date (used to link with the contract dataset).
ClaimAmount The cost of the claim, seen as at a recent date.

freMTPL2freq contains 11 columns:

IDpol The policy ID (used to link with the claims dataset).
ClaimNb Number of claims during the exposure period.
Exposure The period of exposure for a policy, in years.
VehPower The power of the car (ordered values).
VehAge The vehicle age, in years.
DriverAge The driver age, in years (in France, people can drive a car at 18).
BonusMalus Bonus/malus, between 50 and 350: <100 means bonus, >100 means malus in France.
VehBrand The car brand (unknown categories).
VehGas The car gas, Diesel or regular.
Area The density value of the city community where the car driver lives in: from "A" for rural area to "F" for urban centre.
Density The density of inhabitants (number of inhabitants per square-kilometer) of the city where the car driver lives in.
Region The policy region in France (based on the 1970-2015 classification).

freMTPL2sev contains 2 columns:

IDpol The occurrence date (used to link with the contract dataset).
ClaimAmount The cost of the claim, seen as at a recent date.

Source

Unknown private insurer.
Examples

# (1) load of data
#
data(freMTPLfreq)
dim(freMTPLfreq)

data(freMTPLsev)
dim(freMTPLsev)

# (2) check
# should be equal
sum(freMTPLsev$PolicyID %in% freMTPLfreq$PolicyID)
sum(freMTPLfreq$ClaimNb)

# (1) load of data
#
data(freMTPL2freq)
dim(freMTPL2freq)

data(freMTPL2sev)
dim(freMTPL2sev)

Description

The freprojqxINSEE table has been established on INSEE projection for the period 2007-2060 based on median scenario, cf. Blanpain and Chardon (2010), adjusted and selected for the purpose of the book.

The frefictivetable represents a fictive portfolio of 87,090 individuals that enter in a healthy condition and have been observed between 1996-01-01 and 2007-12-31. The exit (that may occur before December 2007) is either "deceased" or "other".

The frefictivetable2,frefictivetable3 represents a fictive portfolio of 100,000 individuals that enter in a healthy condition and have been observed between 1988-12-29 and 1993-12-31. The exit (that may occur before December 1993) is either "deceased" or "other".

The freptfpermdis and freptftempdis datasets comes from two portfolio of two French private companies (insurer or institute), respectively for permanent disability insurance and temporary disability insurance.

Usage

data(freprojqxINSEE)
data(frefictivetable)
data(frefictivetable2)
data(freportportfolio)
data(freportfpermdis)
data(freportftempdis)

**Format**

`freportprojxINSEE` is a data frame of 109 columns and 66 rows:

- **Age** The age.
- **F2007,, F2060** The 1-year female death probabilities
- **M2007,, M2060** The 1-year male death probabilities

`freportvictive` is a data frame of 6 columns and 87,090 rows:

- **Id** the identification number.
- **Gender** the gender as "factor".
- **DateOfBirth** the date of birth as "Date".
- **DateIn** the entry date as "Date".
- **DateOut** the exit date as "Date".
- **Status** the status at exit: "deceased" (i.e. non-censored observation) or "other" (i.e. censored observation) as "factor".

`freportvictive2, freportvictive3` are data frames of 5 columns and 100,000 rows:

- **DateIn** the entry date as "Date".
- **DateOut** the exit date as "Date".
- **Status** the status at exit: "deceased" (i.e. non-censored observation) or "other" (i.e. censored observation) as "factor".
- **DateOfBirth** the date of birth as "Date".
- **Gender** the gender as "factor".

`freportfpermdis` is a data frame of 6 columns and 1,048,575 rows:

- **PolicyID** the policy identification number.
- **BirthDate** the date of birth.
- **Gender** the sex: M for male and F for female.
- **EntryDate** the entry date.
- **ExitDate** the exit date.
- **ExitStatus** the status at exit: "deceased" (i.e. non-censored observation) or "other" (i.e. censored observation).

`freportftempdis` is a data frame of 9 columns and 560,725 rows:

- **Gender** the sex: M for male and F for female.
- **JobType** the job category: "employee", "managers, engineers, sales responsibles", "non-manager employee" "other 1", "other 2", "other 3", "other 4", "other 5", "technician", "unemployed workers".
- **UWType** the underwriting type: either "specific policy in a collective agreement", "specific policy not linked to a collective agreement", "standard policy in a collective agreement" or "standard policy not linked to a collective agreement".
JobStopType the reason for disability: "illness", "work accident", "pregnancy" (for women only).

Birthdate the date of birth.

OccurDate the date of occurrence.

EntryDate the entry date.

ExitDate the exit date.

JobComebackType the status at exit: "recovered" (i.e. non-censored observation: the person goes back to work), "disabled" (i.e. non-censored observation: the person is permanently disabled) or "on-going" (i.e. censored observation).

Source

For freprojqxINSEE, Blanpain and Chardon (2010).


For freptfpermdis, freptftempdis, RessourcesActuarielles

References


Examples

```r
# (1) load of data
#
data(freprojqxINSEE)
data(frefictivetetable)
head(freprojqxINSEE)
head(frefictivetetable)

## Not run:
data(freptfpermdis)
data(freptftempdis)

head(freptfpermdis)
head(freptftempdis)

## End(Not run)
```
hurricanehist

Hurricane history: Per Storm Maximum Wind Speeds (North Atlantic)

Description
The dataset consists of 2010 observations for all tropical cyclones in the NHC best track record over the period 1899-2006. Each observation contains per cyclone maximum wind speeds and other relevant information.

Usage
data(hurricanehist)

Format
hurricanehist contains 7 columns:
Year The Year.
Region The region among "Basin", "East Florida", "Gulf", "US".
Windmax The maximum windspeed in knot (1kt = 0.51 m/s).
NAO the North Atlantic Oscillation (NAO) index as an indicator of storm steering.
SOI the Southern Oscillation Index (SOI) as an indicator of El Nino-Southern Oscillation.
SST the Atlantic sea-surface temperature (SST) as an indicator of cyclone energy.
SSTmda the SST mda.

Source
See http://myweb.fsu.edu/jelsner/_site/.

References

Examples

# (1) load of data
#
data(hurricanehist)
dim(hurricanehist)

# (2) box plot
#
boxplot(Windmax ~ Year, data=hurricanehist,
ylim=c(35,175), subset=Year > 1939)
Description

This dataset used in the CoIL 2000 Challenge contains information on customers of an insurance company. The data consists of 86 variables and includes product usage data and socio-demographic data derived from zip area codes.

The data was collected to answer the following question: Can you predict who would be interested in buying a caravan insurance policy and give an explanation why?

Usage

data(ICB1)
data(ICB2)

Format

ICB1 (resp. ICB2) is a data frame of 86 columns (resp. 85) and 5,822 rows (resp. 4,000). Each record consists of 86 (resp 85) variables, containing sociodemographic data (variables 1-43) and product ownership (variables 44-86). The sociodemographic data is derived from zip codes. All customers living in areas with the same zip code have the same sociodemographic attributes. Variable 86 (Purchase) indicates whether the customer purchased a caravan insurance policy. As ICB2 does not have the 86th column, ICB1 should be used for training purposes and ICB2 for testing purposes.

Columns are detailed below:

- **MOSTYPE** Customer Subtype see L0
- **MAANTHUI** Number of houses 1 - 10
- **MGEMOMV** Avg size household 1 - 6
- **MGEMLEEF** Avg age see L1
- **MOSHOOFD** Customer main type see L2
- **MGODRK** Roman catholic see L3
- **MGODPR** Protestant ...
- **MGODOV** Other religion
- **MRELGE** Married
- **MRELSA** Living together
- **MRELOV** Other relation
- **MFALLEEN** Singles
- **MFGEKIND** Household without children
- **MFWEKIND** Household with children
- **MOPLHOOG** High level education
- **MOPLMIDD** Medium level education
- **MOPLLAAG** Lower level education
MBERHOOG  High status
MBERZELF  Entrepreneur
MBERBOER  Farmer
MBERMIDD  Middle management
MBERARBG  Skilled labourers
MBERARB0  Unskilled labourers
MSKA  Social class A
MSKB1  Social class B1
MSKB2  Social class B2
MSKC  Social class C
MSKD  Social class D
MHHUUR  Rented house
MHKOOP  Home owners
MAUT1  1 car
MAUT2  2 cars
MAUT0  No car
MZFONDS  National Health Service
MZPART  Private health insurance
MINKM30  Income < 30,000
MINK3045  Income 30-45,000
MINK4575  Income 45-75,000
MINK7512  Income 75-122,000
MINK123M  Income >123,000
MINKGEM  Average income
MKOOPKLA  Purchasing power class
PWAPART  Contribution private third party insurance see L4
PWABEDR  Contribution third party insurance (firms) ...
PWALAND  Contribution third party insurance (agriculture)
PPERSAUT  Contribution car policies
PBESAUT  Contribution delivery van policies
PMOTSCO  Contribution motorcycle/scooter policies
PVRAAUT  Contribution lorry policies
PAANHANG  Contribution trailer policies
PTRACTOR  Contribution tractor policies
PWERKT  Contribution agricultural machines policies
PBROM  Contribution moped policies
PLEVEN  Contribution life insurances
PPERSONG  Contribution private accident insurance policies
PGEZONG  Contribution family accidents insurance policies
PWAOREG  Contribution disability insurance policies
PBRAND  Contribution fire policies
PZEILPL  Contribution surfboard policies
PPLEZIER  Contribution boat policies
PFIETS  Contribution bicycle policies
PINBOED  Contribution property insurance policies
PBYSTAND  Contribution social security insurance policies
AWAPART  Number of private third party insurance 1 - 12
AWABEDR  Number of third party insurance (firms) ...
AWALAND  Number of third party insurance (agriculture)
APERSAUT  Number of car policies
ABESAUT  Number of delivery van policies
AMOTSCO  Number of motorcycle/scooter policies
AVRAAUT  Number of lorry policies
AAANHANG  Number of trailer policies
ATRACTOR  Number of tractor policies
AWERKT  Number of agricultural machines policies
ABROM  Number of moped policies
ALEVEN  Number of life insurances
APERSONG  Number of private accident insurance policies
AGEZONG  Number of family accidents insurance policies
AWAOREG  Number of disability insurance policies
ABRAND  Number of fire policies
AZEILPL  Number of surfboard policies
APLEZIER  Number of boat policies
AFIETS  Number of bicycle policies
AINBOED  Number of property insurance policies
ABYSTAND  Number of social security insurance policies
CARAVAN  Number of mobile home policies 0 - 1

L0 information: 1 High Income, expensive child, 2 Very Important Provincials, 3 High status seniors, 4 Affluent senior apartments, 5 Mixed seniors, 6 Career and childcare, 7 Dinki s (double income no kids), 8 Middle class families, 9 Modern, complete families, 10 Stable family, 11 Family starters, 12 Affluent young families, 13 Young all american family, 14 Junior cosmopolitan, 15 Senior cosmopolitans, 16 Students in apartments, 17 Fresh masters in the city, 18 Single youth, 19 Suburban youth, 20 Ethically diverse, 21 Young urban have-nots, 22 Mixed apartment dwellers, 23 Young and rising, 24 Young, low educated, 25 Young seniors in the city, 26 Own home elderly, 27 Seniors in apartments, 28 Residential elderly, 29 Porchless seniors: no front yard, 30 Religious elderly singles, 31 Low income catholics, 32 Mixed seniors, 33 Lower class large families, 34 Large family, employed child, 35 Village families, 36 Couples with teens (Married with children), 37 Mixed small town dwellers, 38 Traditional families, 39 Large religious families, 40 Large family farms, 41 Mixed rurals.

L1 information: 1 20-30 years, 2 30-40 years, 3 40-50 years, 4 50-60 years, 5 60-70 years, 6 70-80 years.
L2 information: 1 Successful hedonists, 2 Driven Growers, 3 Average Family, 4 Career Loners, 5 Living well, 6 Cruising Seniors, 7 Retired and Religious, 8 Family with grown ups, 9 Conservative families, 10 Farmers.

L3 information: 0 0%, 1 1 - 10%, 2 11 - 23%, 3 24 - 36%, 4 37 - 49%, 5 50 - 62%, 6 63 - 75%, 7 76 - 88%.

L4 information: 0 0, 1 1 - 49, 2 50 - 99, 3 100 - 199, 4 200 - 499, 5 500 - 999, 6 1000 - 4999, 7 5000 - 9999, 8 10.000 - 19.999, 9 20.000 - Inf.

Source

Data is (c) Sentient Machine Research 2000

This dataset is owned and supplied by the Dutch datamining company Sentient Machine Research, and is based on real world business data. You are allowed to use this dataset and accompanying information for NON commercial research and education purposes only. It is explicitly NOT allowed to use this dataset for commercial education or demonstration purposes.


References


See Also

http://kdd.ics.uci.edu/databases/tic/tic.html

There is a special website for this benchmark at http://www.liacs.nl/~putten/library/cc2000/. On this website, you can find an online report featuring 29 papers written by participants in the CoIL Challenge 2000 and further background information.

Examples

# (1) load of data
#
data(ICB1)
dim(ICB1)
head(ICB1)

summary(ICB1)

data(ICB2)
**itamtplcost**

*Italian MTPL cost*

**Description**

This dataset contains large losses (in excess of 500 Keuro) of an Italian Motor-TPL company since 1997.

**Usage**

```r
data(itamtplcost)
```

**Format**

*itamtplcost* is a data frame of 2 columns and 457 rows:

- `Date` Date of loss (accident date).
- `UltimateCost` Ultimate cost trended to 2013 and developed to ultimate losses.

**Source**

Unknown private insurer.

**Examples**

```r
# (1) load of data
#  
data(itamtplcost)
```

---

**linearmodelfactor**

*A simulated with linear model factor*

**Description**

A simulated with linear model factor

**Usage**

```r
data(linearmodelfactor)
```

**Format**

The variables for *linearmodelfactor* are

- `X` A numeric.
- `Y` A numeric.
- `Z` A factor.
Examples

# (1) load of data
#
data(linearmodelfactor)

head(linearmodelfactor)

---

lossalae  General Liability Claims

Description

The *lossalae* is a data frame of 1500 rows and 2 columns containing 1,500 general liability claims randomly chosen from late settlement lags and were provided by Insurance Services Office, Inc. Each claim consists of an indemnity payment (the loss, X1) and an allocated loss adjustment expense (ALAE). ALAE are types of insurance company expenses that are specifically attributable to the settlement of individual claims such as lawyers’ fees and claims investigation expenses. The dataset also has an attribute called capped, which gives the row names of the indemnity payments that were capped at their policy limit. This dataset comes from the *evd* package.

The *lossalaefull* is a data frame of 1500 rows and 4 columns containing additional information compared to *lossalae*: the limit of the policy is available.

Usage

data(lossalae)
data(lossalaefull)

Format

*lossalae* contains two columns:

- **Loss**: A numeric vector containing the indemnity payments (USD).
- **ALAE**: A numeric vector containing the allocated loss adjustment expenses (USD).

*lossalaefull* contains four columns:

- **Loss**: A numeric vector containing the indemnity payments (USD).
- **ALAE**: A numeric vector containing the allocated loss adjustment expenses (USD).
- **Limit**: A numeric vector containing the policy limit (USD).
- **Censored**: A binary indicating that the payments are capped to their policy limit (USD).

Source


[http://lstat.kuleuven.be/Wiley/]
References


Examples

# (1) load of data
#
data(lossalae)
data(lossalaefull)

# (2) plot of data
#
plot(lossalae$ALAE, lossalae$Loss, log="xy", pch=19)

norauto

Norwegian fire insurance dataset

Description

This dataset comprises 183,999 observations of automobile insurance policies losses over a one-year period.

Usage

data(norauto)

Format

norauto contains 7 columns (each row is a policy):

Male 1 if the policyholder is a male, 0 otherwise.
Young 1 if the policyholder age is below 26 years, 0 otherwise.
DistLimit The distance limit as stated in the insurance contract: "8000 km", "12000 km", "16000 km", "20000 km", "25000-30000 km", "no limit".
GeoRegion Density of the geographical region (from heaviest to lightest): "High+", "High-", "Medium+", "Medium-", "Low+", "Low-".
Expo Exposure as a fraction of year.
ClaimAmount 0 or the average claim amount if NbClaim > 0.
NbClaim The claim number.
Source

Unknown Norwegian insurer.
Downloaded from University of Oslo: http://www.uio.no/studier/emner/matnat/math/STK4520/h05/undervisningsmateriale/

Examples

# (1) load of data
#
data(norauto)
summary(norauto)

Norberg

Norberg's credibility dataset

Description

This univariate dataset was self-made by Norberg (1979) for pointing out the relevancy of credibility. It contains hypothetic records of binary claim of an insurance portfolio with 20 policies.

Usage

data(Norberg)

Format

Norberg contains 20 columns and 10 rows. Rows are the 10 years of experience, while columns are the 20 policies in the portfolio.

Source

Public.

References

Dataset used in Ragnar Norberg (1979), The credibility approach to experience rating, Scandinavian Actuarial Journal, 181-221.

Examples

# (1) load of data
#
data(Norberg)

# (2) plot and description of data
#
matplot(0:9, apply(Norberg, 2, cumsum)/(1:10), type="l", ylim=c(0, 1), main="Claim experience")
Description
This dataset comprises 9181 fire losses over the period 1972 to 1992 from an unknown Norwegian company. A priority of 500 thousands of Norwegian Krone (NKR) was applied to get this dataset.

Usage
data(norfire)

Format
norfire contains three columns:
Year  The year of claim occurrence.
Loss  The total loss amount NKR thousands.
Loss2012  The total loss amount in thousands of 2012 Norwegian Krone, inflated using the Norwegian CPI.

Source
http://lstat.kuleuven.be/Wiley/

References
Dataset used in Beirlant, Teugels and Vynckier (1996), Practical Analysis of Extreme Values, Leuven University Press.

Examples

# (1) load of data
#
data(norfire)

# (2) plot and description of data
#
boxplot(Loss ~ Year, data=norfire, log="y", xlab="Year",
ylab="Claim size", main="Norwegian fire dataset")
Australian liability insurance triangles

Description

Dataset `nortritpl8800` contains claim triangles from a Norwegian non-life insurer between 1988 and 2000 for bodily injuries. `nortritpl8800` is a list of 5 elements: a triangle of claim counts by the sum of reporting and valuation delay, a triangle of claim payments by the sum of reporting and valuation delay, a triangle of reported incurred claims by the sum of reporting and valuation delay, a triangle of claim payments by valuation delay, a triangle of reported incurred claims by valuation delay. Values are cumulated amounts.

Usage

```r
#1st Line of Business
data(nortritpl8800)
```

Format

`nortritpl8800$countbyrepdel`, `nortritpl8800$paidbyrepdel`, `nortritpl8800$incurbyrepdel` contain the insurance triangles by reporting+valuation delay. `nortritpl8800$paidbydel`, `nortritpl8800$incurbydel` contains the insurance triangles by valuation delay.

References


Examples

```r
# (1) load of data
#

#1st Line of Business
data(nortritpl8800)
```
nzcathist

New Zealand catastrophe historic

Description

Historical disaster statistics in Zealand from 1968 to 2014.

Usage

data(nzcathist)

Format

nzcathist is a data frame of 9 columns:

Year a numeric for the Year.
Quarter a numeric for the quarter of the year.
Date a character string for the date.
FirstDay a Date object for the first day of natural catastrophe.
Event a character string describing the event.
Type a factor describing the event type among the list: "Cyclone", "Earthquake", "Flood", "Flood,Storm", "Hailstorm", "Other", "Power outage", "Storm", "Tornado", "Weather".
Location a character string describing the location.
OriginalCost Original cost in million of Australian dollars (NZD).
NormCost2011 Normed cost in million of 2011 New Zealand dollars (NZD).
NormCost2014 Normed cost in million of 2014 New Zealand dollars (NZD).

Source


Examples

# (1) load of data
#
data(nzcathist)

# (2) plot of data
#
plot(ecdf(nzcathist$NormCost2014))


**Description**

The PnCdemand contains indicators of the demand for property and liability insurance in terms of national economic and risk aversion characteristics. There are 22 countries over 7 years between 1987-1993.

**Usage**

data(PnCdemand)

**Format**

PnCdemand contains 22 columns:

"Name" A character for the country name.
"Country" A numeric for the country identifier.
"Time" A numeric for the time identifier.
"GNPCAP" A numeric for the Gross national product, in US dollars per capita.
"NewMEAS" A numeric for the new measure of wealth produced by the World Bank. It is a composite measure that includes human resources, produced or manufactured assets and natural resources. This variable is time-invariant. It is wealth per capita, in thousands of US dollars.
"RiskAversion" A numeric for the risk aversion, which is proxied by level of education. This is measured by the enrollment ratio of third-level education, that is, the ratio of total enrollment in third-level education institutions to the total population age 20 to 24. Education at the third level is provided by different types of institutions, including universities, teacher-training institutions and technical institutes.
"Protect" A numeric for the protective measures may reduce competition and thus raise prices. Trade barriers are proxied by the insurance market share of foreign firms. Specifically, this is the market share of branches or agencies of foreign undertakings in total domestic non-life insurance.
"PopDens" A numeric for the population density, the average number of people living within a square kilometer.
"Urban" A numeric for the urbanization. The percentage of people living in urban areas.
"LegalSyst" A numeric for the legal system. This is an indicator variable that is equal to one if the country has a common law system and is zero otherwise (statutory law system). This variable is time-invariant.
"CPI" A numeric for the Consumer Price Index, as a percentage.
"Auto" Automobile premium density, computed as total direct gross automobile insurance premiums divided by the country's population. It includes damage or loss to land vehicles as well as liability arising out of the use of motor vehicles. The measure is in US dollars per capita.
"Transport" Transport premium density. Transport insurance includes railway loss, aircraft loss and liability and ship loss and liability.
"Freight" Freight premium density. It includes all damage to or loss of goods in transit or baggage.
"FireProp" Fire and other property damage premium density. It includes damage or loss of property due to fire, explosion, storm, other natural forces, nuclear energy and land subsidence as well as other damage to property.

"PecLoss" Pecuniary loss premium density. It includes credit loss, surety loss and other miscellaneous financial losses.

"GenLiab" General liability premium density. It includes all liability other than motor vehicle, aircraft and ship liability.

"AccSick" Accident and sickness premium density.

"OtherNL" Other non-life premium density. It includes legal expenses, assistance and other miscellaneous insurance.

"MRATE" Motor vehicle ownership per capita.

"NumAcc" Total population number.

Source
FreesBook-LPD

References


Examples

# (1) load of data
#
data(PnCdemand)
TPL policies. Policies are guaranteed for all kinds of material damages, but not bodily injuries. Both datasets are used to fit the models, whereas pg16test is used for training. For confidentiality reasons, most categorical levels have unknown meaning.

pg17trainpol, pg17trainclaim are the two training datasets used for the 2017 pricing game of the French institute of Actuaries organized on November 16, 2017. pg17trainpol contains 100,000 policies for private motor insurance and pg17trainclaim contains 14,243 claims of those 100,00 TPL policies. These training sets correspond to year \( t = 0 \). pg17testyear1, pg17testyear2, pg17testyear3, pg17testyear4 are the four test datasets used for the pricing game: each has 100,000 rows of new policies (drivers willing to purchase insurance for Year \( t \) with \( t = 1, 2, 3, 4 \)).

Usage

```r
data(pg15training)
data(pg15pricing)
```

```r
data(pg16trainpol)
data(pg16trainclaim)
data(pg16test)
```

```r
data(pg17trainpol)
data(pg17trainclaim)
data(pg17testyear1)
data(pg17testyear2)
data(pg17testyear3)
data(pg17testyear4)
```

Format

pg15training and pg15pricing are two dataframes with the same columns:

- **PolNum** The policy number.
- **CalYear** The underwriting year.
- **Gender** The gender of the car driver.
- **Type** The car type (a single letter).
- **Category** The car category (a string character).
- **Occupation** The occupation of the driver (a string character).
- **Age** The driver age, in years (in France, people can drive a car at 18).
- **Group1** The group of the car.
- **Bonus** The bonus-malus (French no-claim discount): \(-30\) means a 30 percent bonus while \(+20\) means a 20 percent malus; see details below.
- **Poldur** The policy age (in year).
- **Value** The car value (in euro).
- **Adind** A dummy variable indicating a material cover.
- **SubGroup2** The subregion of the driver home (unknown category).
- **Group2** The region of the driver home (unknown category).
- **Density** The density of inhabitants (number of inhabitants per km2) in the city the driver of the car lives in.
Expdays Exposure in days.
Numtppd The number of third-party material claims.
Numtpbi The number of third-party bodily injury claims.
Indtppd The total cost of third-party material claims (euro).
Indtpbi The total cost of third-party bodily injury claims (euro).

pg16trainpol, pg16trainclaim, pg16test are dataframes with the following columns:
Year The coverage year.
BeginDate, EndDate Beginning date and ending date of the coverage period (of class "Date").
Exposure The exposure as a fraction of year, computed as the difference between EndDate and BeginDate divided by 365.
PolicyID The identification number of the policy.
PolicyAgeCateg The category of the policy age.
PolicyCateg The category of the policy.
CompanyCreation A dummy indicating if the company has been created.
FleetMgt The fleet management category.
FleetSizeCateg The fleet size category.
Area The geographical area.
PayFreq The payment frequency.
VehiclAge The vehicle age category.
VehiclNb The number of vehicles.
VehiclCateg The vehicle category.
VehiclPower The vehicle power.
LicNb The license number of the vehicle.
Deduc The deductible category.
SumInsured The category of the sum insured.
BusinessType The business type.
ChannelDist The distribution channel.
ClaimNb The claim number.
ClaimCharge The claim charge.
DirectComp As claims correspond only to material damage, the French claim convention (IDA) was applied. So the insurer may directly refund the insured (when DirectComp=TRUE) even if the insurer will sue the third-party insurer to recover the indemnity afterwards.
CompRate The rate of compensation (in percent).
SettlYear The settlement year.

pg17**** are dataframes with the following columns:
id_client The client identification number: a string of the form A00000000 (A followed by an 8-digit number). First client ID is A00000001 and last is A00091488.
id_vehicle The vehicle identification number: a string of the form Vnn (a V followed by a 2-digit number). First vehicle is always numbered V01. If a client has multiple vehicles, then the numeration increases by 1. There is no particular ordering in the vehicles, so their rank should not represent anything valuable.
id_policy The policy identification number, a string of the form Annnnnnnn-Vnn resulting from appending id_client and id_vehicle.

id_year The year of coverage, Year ID begins at "Year 0" and ends at "Year 4".

pol_bonus The policy bonus (French no-claim discount): 0.5 means a 30 percent bonus while 1.2 means a 20 percent malus; see details below.

pol_coverage The coverage category: The coverage are of 4 types: Mini, Median1, Median2 and Maxi, in this order. As you can guess, Mini policies covers only Third Party Liability claims, whereas Maxi policies covers all claims, including Damage, Theft, Windshield Breaking, Assistance, etc.

pol_duration The policy duration: Policy duration represents how old the policy is. It is expressed in year, accounted from the beginning of the current year i. Oldest policies in this portfolio can last since prehistoric ages of 45 years.

pol_sit_duration The policy current endorsement duration: Situation duration represent how old the current policy characteristics are. It can be different from pol duration, because the same insurance policy could have evolved in the past (e.g. by changing coverage, or vehicle, or drivers, ...).

pol_pay_freq The payment frequency: The price of the insurance coverage can be paid annually, bi-annually, quarterly or monthly.

pol_payd A dummy indicating pay as you drive: a string with Yes or No, which indicates whether our client has subscribed a mileage-based policy or not. In those early ages of Year 0, Pay As You Drive was not that current, so they represent a minority in the portfolio.

pol_usage The policy usage: it describes what usage the driver makes from his vehicle, most of time. There are 4 possible values: "WorkPrivate" which is the most common, "Retired" which is presumed to be aimed at retired people (who also are presumed driving less kilometers), "Professional" which denotes a professional usage of the vehicle, and "AllTrips" which is quite similar to Professional (including pro tours). As for the coverage, it would be very surprising that this variable had no effect on frequency.

pol_insee_code The INSEE code of the French city/municipality where the policyholder lives: it is a 5-digits alphanumeric code used by the French National Institute for Statistics and Economic Studies (hence INSEE) to identify "communes" and departments in France. There are about 36,000 "communes" in France, but not every one of them is present in the dataset (there are only 18,000 of them). The first 2 digits of insee code identifies the department (they are 96, not including overseas departments). The insee code or department code can be used to possibly merge external data to the datasets: population density, OSM data, etc.

drv_drv2 A character string indicating if there is a secondary driver: there is always a first driver, which characteristics (age, sex, licence) are provided, but a secondary driver is optional, and is present 1 time out of 3.

drv_age1,drv_age2 The driver age of the ith driver: it is expressed in years counted from the beginning of the considered year. Then, drv_age1 increases by 1 every year, like in real world... Legal age to drive is 18, so you shouldn’t find any age below that limit. Due to the fact that the database is built on existing situations before Year 0, in fact the minimum age is 19 in Year 0 dataset. On the other side, you’ll also find quite old drivers.

drv_sex1,drv_sex2 The driver sex of the ith driver. European rules force insurers to charge the same price for women and men. But driver’s gender can still be used in academic studies, and that’s why drv sex1 is still available in the datasets, and can be used as discriminatory variable in this pricing game.

drv_age_lic1,drv_age_lic2 The age of the driving license of the ith driver. As for the other ages, it is expressed in integer years from the beginning of the current year.
vh_age  The vehicle age: This variable is the vehicle’s age, the difference between the year of release and the current year.

vh_cyl  The engine cylinder displacement is expressed in ml in a continuous scale. This variable should be highly correlated with din power of the vehicle.

vh_din  The vh_din is a representation of the motor power. Highly correlated with din power, cylinder, speed and even value of the vehicle.

vh_fuel  The vehicle fuel type: with mainly two values "Diesel" and "Gasoline". Very few Hybrid vehicles can also be found, but, 6 years ago, the hybrid market was still at its beginning.

vh_make  The vehicle carmaker. As the database is built from a French insurance, the three major brands are Renault, Peugeot and Citroen.

vh_model  The vehicle model. As a subdivision of the carmake, vehicle is identified by its model name.

vh_sale_begin,vh_sale_end  vh_sale_begin and vh_sale_end are the dates (in fact: ages) from the beginning of the current year of the beginning and the end of marketing years of the vehicle. This could for instance identify policies that covers very new vehicles or second-hand ones.

vh_speed  The vehicle maximum speed (km/h), as stated by the manufacturer.

vh_type  The vehicle type, either "Tourism" or "Commercial". There are more "Commercial" types for "Professional" policy usage than for "WorkPrivate".

vh_value  The vehicle’s value (replacement value) is expressed in euros, without inflation so it should be stable from a year to another.

vh_weight  The vehicle weight (kg).

id_claim  The claim identification number: a string of the form CLnn (CL followed by a 2-digit number). Numbering of the claims begins at 1 for every policy and each year. Then, the last value of id claim is the maximum number of claims for a vehicle in a year. Two-digits representation is sufficient : this maximum doesn’t exceed 7 (but not on Year 0, where the maximum is 6).

claim_nb  The claim number, as we are talking about individual claims, each claim nb has a value of 1.

claim_amount  The claim amount: amounts range from (approx.) -2,000 to +300,000. Yes, there are negative values, they come from claims where our driver’s liability is not engaged, so there’s a legal recourse.

The bonus/malus system is compulsary in France, but we will only use it here as a possible feature. The coefficient is attached to the driver. It starts at 1 for young drivers (i.e. first year of insurance). Then, every year without claim, the bonus decreases by 5 percent until it reaches its minimum of 0.5. Without any claim, the bonus evolution would then be : $1 - > 0.95 - > 0.9 - > 0.85 - > 0.8 - > 0.76 - > 0.72 - > 0.68 - > 0.64 - > 0.6 - > 0.57 - > 0.54 - > 0.51 - > 0.5$. Every time the driver causes a claim (only certain types of claims are taken into account), the coefficient increases by 25 percent, with a maximum of 3.5. Thus, the range of bonus/malus coefficient extends from 0.5 to 3.5 in the datasets.

Source

Datasets from unknown private insurers.

See https://freakonometrics.hypotheses.org/20034 for the first pricing game.

See https://actinfo.hypotheses.org/69 for the second pricing game.

See https://actinfo.hypotheses.org/86 for the third pricing game.
Examples

```r
# (1) load of data
#
data(pg15training)
data(pg15pricing)
data(pg16trainpol)
data(pg16trainclaim)
data(pg16test)
data(pg17trainpol)
data(pg17trainclaim)
data(pg17testyear1)

# (2) some check
# should be zero
sum(!pg16trainclaim$PolicyID %in% pg16trainpol$PolicyID)
# should be true
NROW(pg16trainclaim) == sum(pg16trainpol$ClaimNb)
```

description

This dataset contains automobile injury claim number collected in 1993 in Singapore by the General Insurance Association of Singapore. Records contains individuals characteristics in addition to claim counts.

Usage

```r
data(sgautonb)
```

Format

sgautonb is a data frame of 8 columns and 1,340 rows:

- **SexInsured**: Gender of insured, including male (M), female (F) and unspecified (U).
- **Female**: Numeric: 1 if female, 0 otherwise.
- **VehicleType**: The type of vehicle being insured, such as automobile (A), truck (T), and motorcycle (M).
- **PC**: Numeric: 1 if private vehicle, 0 otherwise.
- **Clm_Count**: Number of claims during the year.
- **Exp_weights**: Exposure weight or the fraction of the year that the policy is in effect.
- **LNWEIGHT**: Logarithm of exposure weight.
- **NCD**: No Claims Discount. This is based on the previous accident record of the policyholder. The higher the discount, the better is the prior accident record.
AgeCat  The age of the policyholder, in years grouped into seven categories. 0-6 indicate age groups 21 and younger, 22-25, 26-35, 36-45, 46-55, 56-65, 66 and over, respectively.
VAgeCat  The age of the vehicle, in years, grouped into seven categories. 0-6 indicate groups 0, 1, 2, 3-5, 6-10, 11-15, 16 and older, respectively.
AutoAge0  Numeric: 1 if private vehicle and VAgeCat = 0, 0 otherwise.
AutoAge1  Numeric: 1 if private vehicle and VAgeCat = 1, 0 otherwise.
AutoAge2  Numeric: 1 if private vehicle and VAgeCat = 2, 0 otherwise.
AutoAge  Numeric: 1 if private vehicle and VAgeCat = 0, 1 or 2, 0 otherwise.
VAgecat1  VAgeCat with categories 0, 1, and 2 combined.

Source
FreesBook-RMAFA

References

Examples

```r
# (1) load of data
#
data(sgautonb)
dim(sgautonb)
head(sgautonb)
```

---

**Description**

sgautoprop9701 is a data report incremental payments from a portfolio of automobile policies for a Singapore property and casualty (general) insurer for years 1997-2001. Payments are for third party property damage from comprehensive insurance policies. All payments have been deflated using a Singaporean consumer price index, so they are in constant dollars.

sgautoBI9301 contains payments from a portfolio of automobile policies for a Singapore property and casualty (general) insurer for years 1993-2001. Payments, deflated for inflation, are for third party injury from comprehensive insurance policies.

**Usage**

data(sgautoprop9701)
data(sgautoBI9301)
sgautoprop9701 and sgautoBI9301 are two matrices containing insurance triangles.

Source

Freesbook-RMAFA

References


Examples

```r
# (1) load of data
#
# data(sgautoprop9701)
data(sgautoBI9301)
```

---

**SOAGMI**

*SOA Group Medical Insurance claim dataset*

**Description**

The dataset was collected by SOA for a group medical insurance and contains records of all the claim amounts exceeding 25,000 USD over the period 1991 and is available at [http://www.soa.org](http://www.soa.org). There is no truncation due to maximum benefits.

**Usage**

data(SOAGMI)

**Format**

SOAGMI contains two columns and 371 rows:

- **Year** The year of claim occurrence.
- **Loss** The loss amount in euros (EUR).

**Source**

References

Dataset used in Beirlant, Dierckx, Goegebeur and Matthys (2004), *Statistics of Extremes*, Wiley in 
Grazier and G’Sell (1997), *Group Medical Insurance Large Claims Database and Collection*, 
SOA Monograph M-HB97-1, Society of Actuaries, Schaumburg. 
and in Cebrian, Denuit and Lambert (2003), Analysis of bivariate tail dependence using extreme 
value copulas: An application to the SOA medical large claims database, Belgian Actuarial Bul-

Examples

# (1) load of data 
# 
data(SOAGMI)

spacedata                      Space dataset

Description

This dataset contains 1,698 observations of satellites between 1956 and 2013 where the study focuses 
failure and success once the satellite has reached its targeted orbit. Failures during the launching step 
or the testing step are not considered.

Usage

data(spacedata)

Format

spacedata is a data frame of 16 columns and 1,698 rows:

Event A character string describing the launch: always "LAUNCH: Satellite launched success-
fully".
EventDate The date of the launch.
MissionType A character string describing the mission goals.
InitOrbit A character string for the satellite orbit, see details.
OrbitRange A character string summarizing the satellite orbit.
Position A character for the position.
ContractLife The contractual life (in years).
Sector A character string: either "CIVIL" or "MILITARY".
IsCommercial When civil usage, 1 indicates private (commercial), 0 public (institution).
Mass Mass of satellite (Kg).
RetireDate Date of retirement, if any.
TotalFailDate Date of total failure, if any, see details.
PartialFailDate  Date of partial failure, if any, see details.
AnyFailDate  Date of first failure, in any.
OperLifeTime  Life Length of the satellite (in years) when operating successfully.
Censored  Indicator for censoring.

Details

The satellite orbit is an acronym given by
EO  Elliptical Orbit.
G  Geostationary.
GTO  Geostationary Transfert Orbit.
HEL  Heliocentric Orbit.
HEO  Highly Elliptical Orbit.
LEO  Low Earth Orbit.
MEO  Medium Earth Orbit.
PEO  Polar Elliptical Orbit.
PO  Polar Orbit.
SSO  Sun-Synchronous Orbit

Some details on earth orbit are given below:

**LEO**  Low Earth orbits (LEO) are defined to be orbits with an average altitude that is less than 2,000 km. An important subset of LEO is the sun-synchronous orbit (SSO). These are circular orbits with an altitude between 500 km and 1200 km that provide an orbital period that result in passes over a point on the Earth’s surface at the same time of day, a fixed number of days apart. This is ideal for Earth observation missions. LEO has predominantly been used by civil and military agencies for Earth observation, scientific missions, manned missions and intelligence or spy satellites.

**MEO**  Medium Earth orbits (MEO) are defined to be orbits with an average altitude in the range of 5,000 to 20,000 km. The U.S. military were the first to exploit this orbit with the Global Positioning Satellites (GPS). The numerous satellites in the constellation appear to move slowly across the sky of an observer and several satellites are always visible at any point on the Earth’s surface. A similar orbit is used by the Russia’s equivalent Glonass system and the European Galileo.

**GEO**  The Geostationary Earth Orbit GEO type orbit features an altitude of approximately 36,000 km. The matched orbital period means that the satellite will appear to be nearly stationary in the sky of an observer, allowing for simplified earth communications and a global coverage. The main use of this type of orbit has been for the telecommunications industry, point-to-point, mobile and direct broadcast. A significant secondary user has been for Earth observation, especially meteorological but also military missile launch and nuclear explosion detection satellites. Commercial use of space satellites has tended to concentrate on the GEO orbit with the market predominantly developing in the late 1970s and throughout the 1980s and 1990s. Total demand for launches to GEO again increased to 1997, mainly due to commercial interests, before a sharp decline in demand into the early 2000s.

Generally, a difference is made between partial losses and total losses with the following definitions:

**Total Loss - Constructive Total Loss:**
(1) Total Loss means physical destruction of the spacecraft, no separation from the launch vehicle or injection in a useless orbit, loss of control of the spacecraft. (2) Constructive Total Loss means a partial loss where the loss ratio is equal or above 75 percent, assimilated to a Total Loss.
Partial Loss: loss of performance impacting the spacecraft intended mission, reduction of useful lifetime, permanently intermittent mission based on a predetermined loss formula.

Source
Data based on two actuarial memoirs and partially modified to fit package standards.

References

See Also

Examples

```r
# (1) load of data
#
data(swautoins)
dim(swautoins)
```

---

**swautoins**

*Swedish Motor Insurance dataset*

**Description**
This dataset contains motor insurance data collected in 1977 in Sweden by the Swedish Committee on the Analysis of Risk Premium. Records contains individuals characteristics in addition to claim counts and severities.

**Usage**
data(swautoins)

**Format**
swautoins is a data frame of 7 columns and 2,182 rows:

- Kilometres  Distance driven by a vehicle, grouped into five categories.
- Zone  Graphic zone of a vehicle, grouped into 7 categories.
- Bonus  Driver claim experience, grouped into 7 categories.
Make The type of a vehicle
Insured The number of policyholder years. A policyholder year is the fraction of the year that the policyholder has a contract with the issuing company.
Claims Number of claims.
Payment Sum of payments.

Source
FreesBook-RMAFA

References

Examples
```r
# (1) load of data
#
data(swautoins)
dim(swautoins)
head(swautoins)
```

---

**Description**

This data comes from the former Swedish insurance company Wasa, before its 1999 fusion with Laensfoersaekringar Alliance. In Sweden, insurance involves three types of cover: TPL (third party liability), partial casco and hull. TPL covers any bodily injuries plus property damages caused to others in a traffic accident. Partial casco (may not be used in all countries) covers theft but also some other causes of loss such as fire. Hull covers damage on the policyholder’s own vehicle. Note that the TPL insurance is mandatory, while the others are optional. The three types of cover are often sold in a package as a comprehensive insurance, but they are usually priced separately. This dataset contains information relative to partial casco only for buss in the commercial lines. Transportation companies own one or more buses which are insured for a shorter or longer period. It contains aggregated data on 670 companies that were policyholders at Wasa insurance company during the years 1990-1998.

**Usage**

data(swbusscase)
Format

swbusscase is a data frame of 7 columns and 1,542 rows:

IDpol   The policy ID, recoded for confidentiality reasons.
Area    The type of area.
BusAgeClass The bus age class with 5 unknown categories.
ObsNb   The number of observations for the company in a given tariff cell based on area and age class. There may be more than one observation per record, since each renewal is counted as a new observation.
ClaimNb The number of claims.
AggClaim The sum of claim payments.
Exposure The number of policy years.

Source

OhlsonBook

References


Examples

# (1) load of data
#
data(swbusscase)
dim(swbusscase)
head(swbusscase)

Description

This data comes from the former Swedish insurance company Wasa, before its 1999 fusion with Laensfoersaekringar Alliance. In Sweden, insurance involves three types of cover: TPL (third party liability), partial casco and hull. TPL covers any bodily injuries plus property damages caused to others in a traffic accident. Partial casco (may not be used in all countries) covers theft but also some other causes of loss such as fire. Hull covers damage on the policyholder's own vehicle. Note that The TPL insurance is mandatory, while the others are optional. The three types of cover are often sold in a package as a comprehensive insurance, but they are usually priced separately. This dataset contains information relative to partial casco only for motorcycles. It contains aggregated data on all insurance policies and claims during 1994-1998.
Usage

data(swmotorcycle)

Format

swmotorcycle is a data frame of 9 columns and 64,548 rows:

OwnerAge  The owner age.
Gender  The gender.
Area  The type of area.
RiskClass  The motorcycle class, a classification by the so called EV ratio, defined as (Engine power in kW x 100) / (Vehicle weight in kg + 75), rounded to the nearest lower integer. The 75 kg represent the average driver weight. The EV ratios are divided into seven classes.
VehAge  The Vehicle age, between 0 and 99.
BonusClass  The bonusclass, taking values from 1 to 7. A new driver starts with bonus class 1; for each claim-free year the bonus class is increased by 1. After the first claim the bonus is decreased by 2; the driver can not return to class 7 with less than 6 consecutive claim free years.
Exposure  The number of policy years.
ClaimNb  The number of claims.
ClaimAmount  The sum of claim payments.

Source

OhlsonBook

References


Examples

# (1) load of data
#
data(swmotorcycle)
dim(swmotorcycle)
head(swmotorcycle)
swtriauto is a named list of two triangles: the incurred (cumulative) amounts and the paid (cumulative) amounts.

Usage

```
data(swtriauto)
```

Format

swtriauto is a named list of two matrices, respectively for incurred and paid amounts.

References


Examples

```
# (1) load of data
#
# data(swtriauto)
```

The univariate dataset was collected in the French motor market and comprise 90270 one-year policies for which the claim number is recorded.

Usage

```
data(tplclaimnumber)
```
Format

tplclaimnumber contains three columns:

policy.id The policy identification number.
claim.number The claim number.
driver.age The driver age (given in the insurance contract).

Examples

# (1) load of data
#
data(tplclaimnumber)

# (2) plot and description of data
#
table(tplclaimnumber$claim.number)

ukaggclaim UK Car Insurance Claims for 1975

Description

The data give the average claims for damage to the owner’s car for privately owned and comprehensively insured vehicles in Britain in 1975. Averages are given in pounds sterling adjusted for inflation. The datasets contains 128 observations.

Usage

data(ukaggclaim)

Format

ukaggclaim contains 5 columns:

OwnerAge Policy-holder’s age in years, categorized into 8 levels.
Model Type of car, in 4 groups.
CarAge Vehicle age in years, categorized into 4 levels.
NClaims Number of claims.
AveCost Average cost of each claim in pounds.

Source

The original dataset was provided by Baxter et al. (1980), then used in McCullagh and Nelder (1989). It is also available at http://www.statsci.org/data/general/carinsuk.html.
ukautocoll

References


Examples

```r
# (1) load of data
#
data(ukaggclaim)
dim(ukaggclaim)

# (2) summary
#
sapply(1:5, function(i) summary(ukaggclaim[,i]))
```

ukautocoll  UK Automobile Collision Claims

Description

The data give the average claims and claim counts for insured vehicles in UK. Averages are given in pounds sterling adjusted for inflation. The datasets contains 32 observations.

Usage

data(ukautocoll)

Format

ukautocoll contains 5 columns:

- **Age**  Policy-holder's age in years, categorized into 8 levels.
- **Model**  Type of car, in 4 groups.
- **CarAge**  Vehicle age in years, categorized into 4 levels.
- **NClaims**  Number of claims.
- **AveCost**  Average cost of each claim in pounds.

Source

The original dataset was provided by Baxter et al. (1980), then used in McCullagh and Nelder (1989) and Mildenhall (1999) It is also available at [http://www.statsci.org/data/general/carinsuk.html](http://www.statsci.org/data/general/carinsuk.html).
References


Examples

```r
# (1) load of data
#
data(ukautocoll)
dim(ukautocoll)

# (2) summary
#
sapply(1:NCOL(ukautocoll), function(i) summary(ukautocoll[,i]))
```

---

usautoBI Automobile bodily injury claim dataset

Description

This dataset contains automobile injury claims collected in 2002 by the Insurance Research Council (part of AICPCU and IIA). There are 1,340 records with demographic information, in addition to the claim amount.

Usage

data(usautoBI)

Format

usautoBI is a data frame of 8 columns and 1,340 rows:

- **CASENUM** Case number to identify the claim.
- **ATTORNEY** Whether the claimant is represented by an attorney: 1 is yes.
- **CLMSEX** Claimant’s gender: M for male and F for female.
- **MARITAL** claimant’s marital status: 1 if married, 2 if single, 3 if widowed, and 4 if divorced/separated.
- **CLMINSUR** Whether or not the driver of the claimant’s vehicle was uninsured: 1 if yes, 2 if no, and 3 if not applicable.
- **SEATBELT** Whether or not the claimant was wearing a seatbelt/child restraint: 1 if yes, 2 if no, and 3 if not applicable.
- **CLMAGE** Claimant’s age.
- **LOSS** The claimant’s total economic loss (in thousands of USD).
Source

FreesBook-RMAFA

References


Examples

```r
# (1) load of data
data(usautoBI)
dim(usautoBI)
head(usautoBI)
```

<table>
<thead>
<tr>
<th>usautotriangles</th>
<th><em>US Automobile triangles</em></th>
</tr>
</thead>
</table>

Description

*usautotri19504* comes from Wacek (2007) and represent industry aggregates for private passenger auto liability/medical coverages. This dataset contains cumulative payments between 1995 and 2004 in millions of dollars. Amounts are based on insurance company annual statements from Schedule P (Part 3B). The elements of the triangle represent cumulative net payments, including defense and cost containment expenses.

*usreauto8700* comes from the 2001 edition of the Historical Loss. This dataset has been used by Braun (2004). These data are from reinsurance business for automobile liability coverages for years 1987-2000 and contain cumulative incurred amounts in thousands of US dollars.

Usage

```r
data(usautotri19504)
data(usreauto8700)
```

Format

*usautotri19504*, data(*usreauto8700*) are matrices containing insurance triangles.

Source

FreesBook-RMAFA
References


Examples

# (1) load of data
#
data(usautotri9504)
data(usreauto8700)

usexpense  

**US expense dataset**

Description

This dataset is originally from the National Association of Insurance Commissioners and was examined by Frees (2011). This dataset contains financial statements based on 2005 annual reports for all the property and casualty insurance companies in United States. The annual reports are financial statements that use statutory accounting principles.

Usage

```
data(usexpense)
```

Format

usexpense is a data frame of 15 columns and 384 rows:

- **CompanyName**: Name of the company.
- **Group**: Indicates if the company is affiliated.
- **Mutual**: Indicates if the company is a mutual company.
- **Stock**: Indicates if the company is a stock company.
- **RBC**: Risk-Based Capital.
- **Expenses**: Total expenses incurred, in millions of dollars.
- **StaffWage**: Annual average wage of the insurer’s administrative staff, in thousands of dollars.
- **AgentWage**: Annual average wage of the insurance agent, in thousands of dollars.
- **LongLoss**: Losses incurred for long tail lines, in millions of dollars.
- **ShortLoss**: Losses incurred for short tail lines, in millions of dollars.
usGLtriangles

GWP\text{personal} Gross written premium for personal lines, in millions of dollars.
GWP\text{commercial} Gross written premium for commercial lines, in millions of dollars.
Assets Net admitted assets, in millions of dollars.
Cash Cash and invested assets, in millions of dollars.
LiqRatio The ratio of the liquid assets to the current liabilities level.

Source

FreesBook-RMAFA

References


Examples

```r
# (1) load of data
#
data(usexpense)
```

---

<table>
<thead>
<tr>
<th>usGLtriangles</th>
<th><em>US general liability triangles</em></th>
</tr>
</thead>
</table>

Description

\text{usreGL8190} comes from the 1991 edition of the Historical Loss Development Study published by the Reinsurance Association of American (page 91). This dataset has been used by Mack (1994) and by England and Verrall (2002). These data are from automatic facultative reinsurance business in general liability (excluding asbestos and environmental) coverages for years 1981-1990. Under a facultative basis, each risk is underwritten by the reinsurer on its own merits.

\text{usreGL8700} comes from the 2001 edition of the Historical Loss. This dataset has been used by Braun (2004). These data are from reinsurance business for general liability coverages for years 1987-2000 and contain cumulative incurred amounts in thousands of US dollars.

\text{ustri1fire} is a list of two triangles for fire insurance (one for incurred amounts and the other for paid amounts) from Quard and Mack (2008).

\text{ustri2GL} is a list of three triangles for three line-of-business: commercial automobile businesses, homeowners, workers’ compensation from Kirschner, Kerley and Isaacs (2002). These are cumulative paid amounts in thousands of dollars.

Usage

```r
data(usreGL8190)
data(usreGL8700)
data(ustri1fire)
data(ustri2GL)
```
Format

`usreGL8700` and `usreGL8190` are two matrices containing insurance triangles. `ustri1fire`, `ustri2GL` are named lists.

Source

FreesBook-RMAFA

References


Kirschner, G.S., Kerley C. and Isaacs B. (2002), *Two approaches to calculating correlated reserves indicators across multiple lines of business*, CAS forum fall.

Examples

```r
# (1) load of data
#
data(usreGL8700)
data(usreGL8190)
data(ustri1fire)
data(ustri2GL)
```

ushurricane

*Normalized Hurricane Damages*

Description

Normalized Hurricane Damages in the United States: 1900-2005 used in Pielke et al. (2008). Originally, the data are stored in an Excel file with 4 worksheets. Damages are normalized according to two approaches: (1) the methodology used by Pielke and Landsea (1998), adjusting for inflation, wealth, and population updated to 2005, called PL05; and (2) the methodology used by Collins and Lowe (2001), adjusting for inflation, wealth, and housing units updated to 2005, called CL05.
Usage

data(ushustormloss)
data(ushuannualloss)
data(ushuinflation)
data(ushupopulation)

Format

ushustormloss is a data frame of 7 columns and 207 rows:
Year Year of the Hurricane.
Hurricane.Description Description of the Hurricane.
State States damaged by the Hurricane.
Category Category of the Hurricane.
Base.Economic.Damage Economic damages (original USD).
Normalized.PL05 Normalized PL05 damages (2005 USD).
Normalized.CL05 Normalized CL05 damages (2005 USD).

ushuannualloss is a data frame of 2 columns and 106 rows:
Year Year.
Normalized.PL05 Total year Normalized damages (2005 USD).

ushuinflation is a data frame of 9 columns and 106 rows:
Year Year.
Inflation.Multiplier Inflation multiplier.
Wealth Wealth.
Real.Wealth.Per.Housing.Unit Real wealth per housing unit.

ushupopulation is a data frame of 12 columns and 217 rows:
Storm.ID Storm ID.
Storm.Year Year of the Storm.
Storm.Name Name of the Storm.
County.Original.Population Original population in counties affected by storm.
County.Population.Multiplier County population multiplier.
County.Original.Housing.Units Original housing units in counties affected by storm.
Housing.Units.Multiplier Housing units multiplier.
Year Year
US.Population Total US population.
US.Housing.Units Total US housing units.
Source

http://sciencepolicy.colorado.edu/publications/special/normalized_hurricane_damages.html

References


Examples

```r
# (1) load of data
#
data(ushustormloss)
```

| ushustormloss4980 | Normalized Hurricane Damages in US between 1949 and 1980 |

Description

Normalized Hurricane Damages in the United States due to single hurricanes. They applied to the period from 1949 and 1980 and are adjusted for inflation. Originally, the dataset was compiled by the American Insurance Association and is also reported in Beirlant, Teugels and Vynckier (1996).

Usage

```r
data(ushustormloss4980)
```

Format

`ushustormloss4980` is a data frame of 7 columns and 207 rows:

- `NormLoss80` Normalized damages (million of 1980 USD).

References


Examples

```r
# (1) load of data
#
data(ushustormloss4980)
```
uslapseagent

United States lapse dataset from tied-agent channel

Description

The uslapseagent portfolio contains detailed information on the 29,317 Whole Life policies, all sold from the tied-agent channel between January 1995 and December 2008. For each policy, we know the issuance date, the gender of the policyholder, the age category, etc... Unfortunately, some variables are rather uninformative.

Usage

data(uslapseagent)

Format

uslapseagent is a data frame of 14 columns and 29,317 rows:

issue.date Issue date. For policies not terminated in December 2008, we have non information: fixed right censored.
duration Time duration in quarters, unknown if censored.
acc.death.rider Indicates if the policy has an accidental death rider (i.e. an option covering accidental death).
gender The gender of the policyholder.
premium.frequency The premium frequency: either infra-annual (monthly, quarterly, semi-annual); annual or supra-annual.
risk.state The risk state: either "Smoker" or "NonSmoker".
derunderwriting.age The underwriting age: either "Young" (between 0 and 34 years old), "Middle" (between 35 and 54 years old) or "Old" (between 55 and 84 years old).
living.place The living place (categorical value).
annual.premium The annual premium (standardized scale): mean 560.88 and standard deviation 526.58 in original USD scale.
DJIA the last observed quarterly variation of the DowJones Index (in standardized scale): mean 0.00178 and standard deviation 0.0494 in original scale.
termination.cause The type of termination.
surrender A binary variable indicating the surrender by policyholder.
death A binary variable indicating the death of policyholder.
other A binary variable indicating other termination such as term.
allcause A binary variable indicating all termination.

Source

Unknown non-life insurers from United States, used in Milhaud and Dutang (2018), preprint at https://hal.archives-ouvertes.fr/hal-01985256
References


Examples

# (1) load of data
#
data(uslapseagent)
head(uslapseagent)

### usmassBI

**Massachusetts Automobile bodily injury claim datasets**

**Description**

The dataset *usmassBI* contains automobile bodily injury claims collected in 2001 in Massachusetts, and studied in Frees (2010) and Rempala and Derrig (2005). There are 348 records with demographic information, in addition to the claim amount. Claims that are closed by year end are excluded. Potential fraudulent claims are from provider=A.

The dataset *usmassBI2* contains automobile bodily injury claims collected between 1993 and 1998 in Massachusetts, and studied in Frees and Wang (2005). This is a sample of 29 Massachusetts towns described in Frees (2003). Claim amounts have been rescaled to adjust for the effects of inflation: all claims are in 1991 dollars, using the Consumer Price Index (CPI) for the rescaling factor.

**Usage**

data(usmassBI)
data(usmassBI2)

**Format**

*usmassBI* is a data frame of 8 columns and 1,340 rows:

- **claims** Claim amount for bodily insurance coverage (in millions of USD).
- **provider** Health care provider is either "A" or "Other".
- **providerA** Binary variable indicating the presence of "Other" provider.
- **logclaims** Logarithm of claim amount.

*usmassBI2* is a data frame of 5 columns and 174 rows:

- **TOWNCODE** The index of Massachusetts towns.
- **YEAR** The calendar year of the observation.
- **AC** Average claims per unit of exposure.
- **PCI** Per-capita income of the town.
- **PPSM** Population per square mile of the town.
usmedclaim

Source

FreesBook-RMAFA

References


Examples

```r
# (1) load of data
#
data(usmassBI)
dim(usmassBI)
head(usmassBI)

# (1) load of data
#
data(usmassBI2)
dim(usmassBI2)
head(usmassBI2)

# summary tables
sapply(levels(usmassBI2$TOWNCODE), function(x) summary(subset(usmassBI2, TOWNCODE == x)$AC))
sapply(unique(usmassBI2$YEAR), function(x) summary(subset(usmassBI2, YEAR == x)$AC))

# plot average claims
plot(AC~YEAR, data=usmassBI2)
for(i in usmassBI2$TOWNCODE) lines(AC~YEAR, data=subset(usmassBI2, TOWNCODE== i), col=i)
```

usmedclaim  US Medical claim incremental triangles

Description

This dataset comes from Gamage et al. (2007) and contains medical-care payments by month between January 2001 and December 2003. Payments for medical-care coverage come from policies with no deductible or coinsurance. For a given month and a development year, payments are aggregated among members but are cumulated over development year. The payments exclude prescription drugs that typically have a shorter payment pattern than other medical claims.
Usage

data(usmedclaim)

Format

usmedclaim is a matrix containing two columns (with members count and month) and the insurance triangle.

Source

FreesBook-RMAFA

References


Examples

# (1) load of data
#
data(usmedclaim)
head(usmedclaim, 10)

# (2) graph of data
#
matplot(t(as.matrix(usmedclaim[,-(1:2)])), type="b", main="Payment by accident month", xlab="Month", ylab="Amount (USD)"

---

usprivautoclaim  US Private Auto Claims

Description

This dataset contains claim amounts for private motor insurance from a US property and casualty insurer. Claims that were not closed by the year end are excluded. A risk classification is available and is based on driver and vehicle characteristics.

Usage

data(usprivautoclaim)
usquakeLR

Format

usprivautoclaim contains 5 columns:

  STATE  State in US.
  CLASS  Risk category.
  GENDER Gender.
  AGE  Driver age.
  PAID  Claim amount.

Source

FreesBook-RMAFA

References


Examples

```r
# (1) load of data
#
# data(usprivautoclaim)
dim(usprivautoclaim)
```

```
usquakeLR  California earthquake loss ratios
```

Description


Usage

```r
data(usquakeLR)
```

Format

usquakeLR is a data frame of 2 columns and 24 rows:

  Year  Year of the earthquake.
  LossRatio  Loss ratio.
References


and


Examples

```r
# (1) load of data
#
data(usquakeLR)

# (2) plot log scale
#
plot(usquakeLR$Year, usquakeLR$LossRatio+1e-3, 
ylim=c(1e-3, 1e4), log="y", ylab="Loss Ratio", xlab="Year")
```

---

**ustermlife**  
**US Term Life insurance**

Description

This dataset comes from Survey of Consumer Finances (SCF), a nationally representative sample that contains extensive information on assets, liabilities, income, and demographic characteristics of those sampled (potential U.S. customers). It contains a random sample of 500 households with positive incomes that were interviewed in the 2004 survey. For term life insurance, the quantity of insurance is measured by the policy face, the amount that the company will pay in the event of the death of the named insured. Characteristics include annual income, the number of years of education of the survey respondent and the number of household members.

Usage

```r
data(ustermlife)
```

Format

**ustermlife** is a data frame of 15 columns and 384 rows:

- **Gender** Gender of the survey respondent.
- **Age** Age of the survey respondent.
- **MarStat** Marital status of the survey respondent: 1 if married, 2 if living with partner, and 0 otherwise.
- **Education** Number of years of education of the survey respondent.
- **Ethnicity** Ethnicity.
This dataset contains claims numbers for a sample of 15,775 automobiles that were sold and under warranty for 365 days. Warranties are guarantees of product reliability issued by the manufacturer. The warranty data are for one vehicle system (e.g., brakes or power train) and cover one year with a 12,000 mile limit on coverage.

Usage

data(uswarrantaggnum)
Format

uswarrantagggnum is a data frame of 8 columns and 1,340 rows:

PolicyNumber Policy number.
ClaimNumber Claim number. 5 is actually 5 and more.

Source

FreesBook-RMAFA

References


Examples

```r
# (1) load of data
#
data(uswarrantagggnum)
uswarrantagggnum
```

Description

The dataset *usworkcomp* is originally from the National Council on Compensation Insurance and was examined by Klugman (1992), Frees et al. (2001) and Frees (2011). This database contains records of losses due to permanent or partial disability claims for workers compensation insurance in US. For each claim amount, the payroll is available as a measure of exposure units. A total of 847 data points is available coming from the observation of 121 risk classes over 7 years.

The dataset *usworkcomptri8807* comes from an unknown US insurer: this reserve triangle was used in Lacoume (2007).

Usage

```r
data(usworkcomp)
```
Format

usworkcomp is a data frame of 4 columns and 847 rows:

CL  Occupation class identifier, 1-124.
YR  Year identifier, 1-7.
PR  Payroll, a measure of exposure to loss, in dollars.
LOSS Losses related to permanent partial disability, in dollars.

usworkcomptri8807 is a reserve triangle with 21 development years and 20 accident years.

Source

FreesBook-RMAFA

References

Lacoume, A. (2007), Mesure du risque de reserve sur un horizon de un an, Actuary memoir, ISFA.

Examples

# (1) load of data
#
data(usworkcomp)

# Table 3 of Fres et al. (2001)
# (in million USD)

t(sapply(unique(usworkcomp$YR),
function(y) summary( subset(usworkcomp, YR == y) [,"PR"] / 10^6 )))
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