

# Package ‘expsmooth’

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**Title** Data sets from “Forecasting with exponential smoothing”

**Description** Data sets from the book “Forecasting with exponential smoothing: the state space approach” by Hyndman, Koehler, Ord and Snyder (Springer, 2008).

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**LazyData** yes

**LazyLoad** yes

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**License** GPL (>= 2)

**URL** <http://robjhyndman.com/software/expsmooth/>

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expsmooth-package      *Data sets for "Forecasting with exponential smoothing"*

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**Description**

Data sets from the book "Forecasting with exponential smoothing: the state space approach" by Hyndman, Koehler, Ord and Snyder (Springer, 2008).

**Author(s)**

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**References**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer. [www.exponentialsMOOTHING.net](http://www.exponentialsMOOTHING.net).

---

ausgdp      *Quarterly Australian GDP*

---

**Description**

Quarterly Australian GDP per capita, 1971:1 - 1998:1

**Usage**

data(ausgdp)

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer.

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(ausgdp,main="Australian GDP per capita",ylab="dollars",xlab="Year")
```

---

bonds	<i>Monthly US government bond yields</i>
-------	--

---

**Description**

Monthly US government 10-year bond yields (percent pa) from Jan 1994 to May 2004

**Usage**

```
data(bonds)
```

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer.

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(bonds,main="US 10-year bonds yield",ylab="Percentage per annum",xlab="Year")
```

cangas

*Monthly Canadian gas production*

---

**Description**

Monthly Canadian gas production, billions of cubic metres, January 1960 - February 2005

**Usage**

```
data(cangas)
```

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer.

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(cangas,main="Monthly Canadian gas production",ylab="billion cubic metres",xlab="Year")
```

---

carparts

*Monthly sales car parts*

---

**Description**

Monthly sales car parts. 2674 series. Jan 1998 - Mar 2002.

**Usage**

```
data(carparts)
```

**Format**

multiple time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(carparts[,2001:2010],main="Monthly car part sales",xlab="Year")
```

---

dji *Monthly Dow Jones Index*

---

**Description**

Monthly Dow Jones Index: Open, High, Low, Close. Jan 1990 - Mar 2007

**Usage**

```
data(dji)
```

**Format**

multiple time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer.

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(dji,plot.type="single",main="Dow Jones Index",xlab="Year",ylab="",col=1:4)  
legend("bottomright",legend=colnames(dji),col=1:4,lty=1)
```

---

`djiclose`*Monthly Dow Jones Index: closing*

---

**Description**

Closing values of the Dow Jones Index on the first day of each month, October 1928 - Dec 2007.  
Two columns: close and pcreturn.

**Usage**

```
data(djiclose)
```

**Format**

multiple time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer.

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(djiclose,main="Dow Jones Index",xlab="Year")
```

---

`enplanements`*Monthly US domestic enplanements*

---

**Description**

"Domestic Revenue Enplanements (millions): 1996-2000. SOURCE: Department of Transportation, Bureau of Transportation Statistics, Air Carrier Traffic Statistic Monthly.

**Usage**

```
data(enplanements)
```

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(enplanements,main="US domestic enplanements",ylab="millions",xlab="Year")
```

---

fmsales

*Weekly FM sales*

---

**Description**

Sales of a product for 62 weeks starting in early 2003.

**Usage**

```
data(fmsales)
```

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer.

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(fmsales,ylab="FM sales (thousands)",xlab="Week")
```

freight

*Annual US new freight cars*

---

**Description**

Annual US new freight cars, 1947-1993. Freight cars, new (excl. rebuilt), new orders, equip. mfrs. Series N0193 from the M3 competition.

**Usage**

```
data(freight)
```

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer. [www.exponentialsMOOTHING.net](http://www.exponentialsMOOTHING.net)

**References**

<http://www.forecastingprinciples.com/data.html>

**Examples**

```
plot(freight,main="New freight cars shipped in USA",xlab="Year",ylab="")
```

---

frexport*Quarterly French exports*

---

**Description**

Quarterly exports of a French company. (in thousands of francs) taken from Makridakis et al. (1998, p.162).

**Usage**

```
data(frexport)
```

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer.

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(frexport,ylab="thousands of francs",main="Quarterly exports",xlab="Year")
```

---

gasprice	<i>US gasoline prices</i>
----------	---------------------------

---

**Description**

Monthly US retail gasoline price (the average price per gallon, in dollars) and the spot price of a barrel of West Texas Intermediate (WTI) oil in dollars as traded at Cushing, Oklahoma. Jan 1991 - Nov 2006.

**Usage**

```
data(gasprice)
```

**Format**

bivariate time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer.

**References**

<http://www.exponentialsMOOTHING.net>. These series are available from the US Energy Information Administration website <http://www.eia.doe.gov>.

**Examples**

```
par(mar=c(5,4,2,5))
plot(gasprice[,1],xlab="Year",ylab="Average retail price per gallon (dollars)",main="Gasoline and oil prices")
par(new=TRUE)
plot(gasprice[,2],col="blue",xaxt="n",yaxt="n",xlab="",ylab="")
axis(4)
mtext("Spot price per barrel (dollars)",side=4,line=3)
legend("topleft",col=c("black","blue"),lty=1,legend=c("Ave retail price of gasoline","Spot price of WTI oil"))
```

---

hospital	<i>Monthly patient count</i>
----------	------------------------------

---

**Description**

Monthly patient count for products that are related to medical problems. There are 767 time series that had a mean count of at least 10 and no zeros.

**Usage**

```
data(hospital)
```

**Format**

multiple time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(hospital[,1:10],main="Monthly patient count",xlab="Year")
```

---

jewelry	<i>Weekly jewelry sales</i>
---------	-----------------------------

---

**Description**

Weekly sales of 314 costume jewelry items over the period week 5, 1998 to week 24, 2000.

**Usage**

```
data(jewelry)
```

**Format**

multiple time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer.

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(jewelry[,1:10],main="Weekly sales of costume jewelry items",xlab="Year")
```

---

mcopper

*Monthly copper prices*

---

**Description**

Monthly copper prices. Copper, grade A, electrolytic wire bars/cathodes,LME,cash (pounds/ton)  
Source: UNCTAD (<http://stats.unctad.org/Handbook>).

**Usage**

```
data(mcopper)
```

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(mcopper,main="Monthly copper price",ylab="pounds per ton",xlab="Year")
```

---

msales

*Monthly product sales*

---

**Description**

Monthly sales for a product with shortage indicators. Contains sales (first column) and stockout indicator (second column).

**Usage**

```
data(msales)
```

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(msales[,1],main="Monthly sales of a product",ylab="Sales",xlab="Year")
points(msales,pch=(msales[,"stockouts"]==1)+1)
legend("bottomright",pch=1:2,legend=c("Excess stock","Stock shortage"))
```

---

partx

*Monthly sales of an automobile part*

---

**Description**

Monthly sales of an automobile part.

**Usage**

```
data(partx)
```

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(partx,main="Monthly sales of an automobile part",ylab="Sales",xlab="Year")
```

---

ukcars

*Quarterly UK passenger car production*

---

**Description**

Quarterly UK passenger car production (thousands of cars). 1997:1-2005:1

**Usage**

```
data(ukcars)
```

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(ukcars,main="UK passenger vehicle production",ylab="Thousands of cars",xlab="Year")
```

---

`unemp.cci`*Unemployment and the CCI*

---

**Description**

100 monthly observations on the consumer confidence index (`cci`) and seasonally adjusted civilian unemployment (`unemp`) in the US, covering the period June 1997 – September 2005. The third column is an "terrorism" indicator variable taking value 1 from September 2001.

**Usage**

```
data(unemp.cci)
```

**Format**

multiple time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer.

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(unemp.cci[,1:2],main="Unemployment and the CCI",xlab="Year")
```

---

`usgdp`*Quarterly US GDP*

---

**Description**

Quarterly US GDP. 1947:1 - 2006.1.

**Usage**

```
data(usgdp)
```

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(usgdp,main="Quarterly US GDP",xlab="Year",ylab="US Dollars")
```

---

usnetelec

*Annual US net electricity generation*

---

**Description**

Annual US net electricity generation (billion kwh) for 1949-2003

**Usage**

```
data(usnetelec)
```

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer.

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(usnetelec,main="Annual US net electricity generation",ylab="billion kwh",xlab="Year")
```

---

utility	<i>Hourly utility demand</i>
---------	------------------------------

---

**Description**

Hourly utility demand, mid western USA from 1 Jan 2003

**Usage**

```
data(utility)
```

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer.

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(utility,main="Hourly utility demand",ylab="MW",xlab="Day")
```

---

vehicles	<i>Hourly vehicle counts</i>
----------	------------------------------

---

**Description**

Hourly vehicle counts on Monash Freeway, outside Melbourne in Victoria, Australia, beginning August 1995.

**Usage**

```
data(vehicles)
```

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer.

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(vehicles,main="Hourly vehicle count",xlab="Day",ylab="Number of vehicles")
```

---

visitors

*Monthly Australian overseas visitors*

---

**Description**

Monthly Australian short-term overseas visitors. May 1985-April 2005

**Usage**

```
data(visitors)
```

**Format**

time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer.

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(visitors,main="Overseas visitors to Australia",ylab="Thousands of people",xlab="Year")
```

---

xrates                      *Monthly exchange rates*

---

**Description**

Monthly foreign exchange rates: US dollar and UK pound against the Australia dollar. audusd contains USD/AUD and audukp contains UKP/AUD.

**Usage**

```
data(xrates)
```

**Format**

multiple time series

**Source**

Hyndman, R.J., Koehler, A.B., Ord, J.K., and Snyder, R.D., (2008) *Forecasting with exponential smoothing: the state space approach*, Springer.

**References**

<http://www.exponentialsMOOTHING.net>

**Examples**

```
plot(xrates,main="Foreign exchange rates",xlab="Year")
```

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