

sifds: Swedish inflation forecast data set 1999:Q2–2005:Q2

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Abstract

A data set consisting of 25 forecasts (1999–2005) by Sveriges Riksbank (RB) and 18 forecasts (2001–2005) by Konjunkturinstitutet (KI) for Swedish inflation rates measured as CPI and KPIX.

JEL: Y10

Keywords: Inflation forecast data, inflation data, Sweden, CPI, KPIX, SIFDS.

1 Introduction

Since 1993 the objective of Sveriges Riksbank (the central bank of Sweden) has been price stability. In 1995 a self-adopted explicit inflation target of a yearly 2 percent increase in consumer prices with a tolerance band of ± 1 percent units around the target was implemented. In order to determine whether a change in main policy instrument of the Riksbank (the repo rate) is necessary for the Bank forecasts the inflation rate.

Between 1999 and 2005 Sveriges Riksbank produced a sequence of 25 comparable judgemental forecasts.¹ One forecast was produced each quarter 1999:Q2–2005:Q2. The forecasts all had an horizon of 1–25/26 months and the point forecasts were accompanied with interval forecasts for 50, 75 and 90 percent coverage. A major underlaying assumption for all forecasts was that the repo rate (the bank’s major policy instrument) was unchanged. The forecasts were made for two different inflation measures; changes in consumer price index (CPI) and underlaying inflation (KPIX; before November 12, 2007 called UND1X).

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¹The forecast procedure is described in Blix and Sellin (1998, 1999) and briefly in Berg (2000).

In 2005 some major changes in the forecast methodology were introduced. Most important was that the underlying assumption of an unchanged repo rates was replaced by an assumption that the repo rate would change according to the bank's prediction. Also, the frequency of the forecasts was changed from four to three times a year.²

The *Swedish Inflation Forecast Data Set 1999:Q2–2005:Q2 (SIFDS)* contains (i) these forecasts from Sveriges Riksbank as well as (ii) 18 reference forecasts from Konjunkturinstitutet (KI, the National Institute of Economic Research) made 2001:Q1–2005:Q2 and (iii) outcome data. These KI reference forecasts were also made for inflation measured as yearly changes in CPI and KPIX, but the forecast horizon varied between 21 and 30 months. Also, no interval forecasts were reported.

The SIFDS is distributed as the R (R Development Core Team, 2009) package **sifds** via the Comprehensive R Archive Network (<http://www.cran.r-project.org>) and this article describes in detail the data sources and how the data set was constructed. The package **sifds** also contains some convenience functions that facilitates the extraction of subsets of point forecast errors from the data set.

2 Sources

The SIFDS contains three types of data: (i) forecasts from Riksbanken (RB), forecasts from Konjunkturinstitutet (KI) and outcome from Statistics Sweden (SCB):

- The forecasts from Riksbanken are publicly available at the bank's website as Windows Excel spread sheet files. The exact Universe Resource Locators (URL's) to all of these files are given below. All files are distributed with the package. The data was downloaded January 12, 2010.
- The forecasts from Konjunkturinstitutet are not available in the same way. However, KI has gracefully made available a Windows Excel file containing its forecasts. This file is distributed with the **sifds** package under the name **ki.xls**. The data was received from KI June 11, 2008.
- The outcome data for changes in CPI and KPIX 1997:M05–2007:M07 were downloaded as ASCII text files from the Statistics Sweden webpage <http://www.scb.se> at March 25, 2010. Note that these series are basically changes in shadow indices, which means that contrary to the fixed index series, outcome data available at Statistics Sweden may be revised in the future. The download was made manually but

²Sveriges Riksbank (2005, p. 5f).

file names were chosen by the database. The downloaded files are distributed *as downloaded* with the **sifds** package; the file **PR0101D3.scb** contains the changes in the CPI and the file **PR0101D5.scb** the changes in KPIX.

3 Setting up R

All data handling was made on an i486-pc-linux-gnu platform using R version 2.10.1 (2009-12-14), with packages **stats**, **graphics**, **grDevices**, **utils**, **datasets**, **methods**, and **base** loaded by default. The default options were modified as follows:

```
> options(width=65,digits=4)
```

The following R packages were used:

```
> library(utils)
> library(gdata)
```

The base package **utils** was loaded to give access to the function **download.file()**, which download files from remote URL's. Package **gdata** (version 2.7.1 (2010-01-27)) gives access to **read.xls()**, which reads Microsoft Excel files independent of platform but requires that Perl (see <http://www.perl.org>) is installed.

4 Outcome data

The outcome data are as noted above available in the files **PR0101D3.scb** (CPI) and **PR0101D5.scb** (KPIX). These files are formatted as if the text files should be printed, with headers and information about the data in the end of the file. In each file data are organised in two chunks separated by a text chunk which makes it necessary to use **read.table()** twice for each series to read the data. The first column in each text file contains the date, which is not read since dates are set by the function **ts()**:

```
> cpi.outcome <- ts(read.table("sifds/inst/extdata/PR0101D3.scb",
+   skip=1,colClasses=c("NULL","numeric"),encoding="UTF-8"),
+   ,start=c(1999,5),frequency=12)
> kpix.outcome <- ts(read.table("sifds/inst/extdata/PR0101D5.scb",
+   skip=1,colClasses=c("NULL","numeric"),encoding="UTF-8"),
+   ,start=c(1999,5),frequency=12)
```

5 Sveriges Riksbank's forecasts

5.1 Introduction

The inflation forecasts from Sveriges Riksbank are published in their inflation reports. The long terms forecasts are available in the reports as graphs but also on Bank's webplace as Microsoft Excel spread sheet files. These spread sheet files are basically organised so as to produce the graphs, and not for the purpose of research or forecast evaluation. This means that (i) the path to the files, (ii) the file base names, (iii) which order the relevant spread sheets have within each file and (iv) at which row the first forecast is in each spread sheet, *all changes over the different forecast origins!*

In order to avoid an error prone manual procedure to make these 50 spread sheets available, the downloading and reading of the data is left to three functions. The functions utilise a number of variables, capitalised in the definitions of the functions, such as URL, PATH etc. These are discussed below:

1. `download.rb` downloads the spread sheet files contingent on that these files have not been previously downloaded:

```
> download.rb <- function(origin=ORIGIN,file=FILE,
+   path=PATH,url= URL)
+ {
+   File.Name <- paste("sifds/inst/extdata/rb",origin[1],"_",
+     origin[2],".xls",sep="")
+   if (file.exists(File.Name)==FALSE)
+     download.file(paste(URL,PATH,FILE,sep=""),File.Name)
+ }
```

When the file is saved a new file is created on the form `rbyear_quarter.xls`.

2. `rb2ts` read the relevant parts of a specified spread sheet using `read.xls` from package **gdata** and makes it into a time series object:

```
> rb2ts <- function(x)
+ {
+   if (x=="cpi") y <-1
+   if (x=="kpix") y <-2
+   ts(read.xls(paste("sifds/inst/extdata/rb",ORIGIN[1],"_",ORIGIN[2],
+     ".xls",sep=""),header=FALSE,col.names=COLNAMES,
+     nrow=HORIZON,sheet=SHEETS[y],skip=SKIP[y],
+     colClasses=c("NULL",rep(NA,3),"NULL",rep(NA,4),
+       rep("NULL",6))),
+     start=START,frequency=12)
+ }
```

When each file is saved a new file name containt the year and quarter of th forecast origin is chosen.

3. `make.rb.cpi` and `make.rb.kpix` executes `rb2ts` for the CPI and KPIX data series respectively and creates a time series object containing the CPI and KPIX forecasts and outcome data.

```
> make.rb.cpi <- function()
+ {
+   cpi <- rb2ts("cpi")
+   cpi <- ts.intersect(cpi,cpi.outcome)
+   cpi
+ }
> make.rb.kpix <- function()
+ {
+   kpix <- rb2ts("kpix")
+   kpix <- ts.intersect(kpix,kpix.outcome)
+   kpix
+ }
```

These functions are provided with input data in the form of global variables in order to be able to read the relevant spread sheets. Some of this input data is the same for all spread sheets. The following data is the same for all spread sheets: (i) The URL to Sveriges Riksbank's webplace and (ii) the column names in the spread sheets and their order in each of the spread sheets:

```
> URL <- "http://www.riksbank.se/"
> COLNAMES <- c("X1","190","175","150","X2","mode","u50","u75",
+               "u90","X3","X4","X5","X6","X7","X8")
```

However there are some input data which varies between spread sheets and which below is given specifically for each spread sheet:

PATH The path is given excluding the URL and the file base name and extension.

FILE There exists no convention for the naming of file base names. The naming is almost completely idiosyncratic. The name of the file extension is, however, always `xls`. Therefore **FILE** is set to the filename (including extension) of the relevant Microsoft Excel file.

SHEETS The locations of the relevant sheets within each file (i.e., the order of the sheets) varies between files. Also, whether the CPI or the KPIX forecast is first or second varies. **SHEETS** is given as a tuple giving the order of the two sheets in the file.

SKIP The number of rows before the first forecast in the relevant sheets varies, not only between files but also between CPI and KPIX forecasts within the same file. **SKIP** is given as a tuple giving the number of rows to skip in the two sheets.

ORIGIN The forecast origin is given as a tuple giving the year and quarter of the forecast origin.

START The date of the first (the one-step-ahead) forecast at the forecast origin. It is given as a tuple giving the year and month. In most years starting months are March, May, September and November, but not always.

HORIZON The forecast horizon is either 1 – 25 or 1 – 26 months ahead. In most years the horizon over a calendar year is 26, 25, 26, and 25 months, but not always.

Finally, we produce a list of empty elements to contain the RB forecasts:

```
> rb.origins <- list(F1999.Q2=NULL,F1999.Q3=NULL,F1999.Q4=NULL,
+   F2000.Q1=NULL,F2000.Q2=NULL,F2000.Q3=NULL,F2000.Q4=NULL,
+   F2001.Q1=NULL,F2001.Q2=NULL,F2001.Q3=NULL,F2001.Q4=NULL,
+   F2002.Q1=NULL,F2002.Q2=NULL,F2002.Q3=NULL,F2002.Q4=NULL,
+   F2003.Q1=NULL,F2003.Q2=NULL,F2003.Q3=NULL,F2003.Q4=NULL,
+   F2004.Q1=NULL,F2004.Q2=NULL,F2004.Q3=NULL,F2004.Q4=NULL,
+   F2005.Q1=NULL,F2005.Q2=NULL)
> rb <- list(cpi=rb.origins,kpix=rb.origins)
```

5.2 Forecast origin 1999:Q2

```
> PATH      <- "upload/2389/"
> FILE      <- "Bilaga2.xls"
> SHEETS    <- c(22,23)
> SKIP      <- c(56,56)
> ORIGIN    <- c(1999,2)
> START     <- c(1999,5)
> HORIZON   <- c(26)
> download.rb()
> rb$cpi$F1999.Q2 <- make.rb.cpi()
> rb$kpix$F1999.Q2 <- make.rb.kpix()
```

5.3 Forecast origin 1999:Q3

```
> PATH      <- "upload/3420/"
> FILE      <- "25-50.xls"
> SHEETS    <- c(26,27)
```

```

> SKIP      <- c(61,61)
> ORIGIN    <- c(1999,3)
> START     <- c(1999,9)
> HORIZON   <- c(25)
> download.rb()
> rb$cpi$F1999.Q3 <- make.rb.cpi()
> rb$kpix$F1999.Q3 <- make.rb.kpix()

```

5.4 Forecast origin 1999:Q4

```

> PATH      <- "upload/3597/"
> FILE      <- "Dia39-48.xls"
> SHEETS    <- c(9,10)
> SKIP      <- c(63,63)
> ORIGIN    <- c(1999,4)
> START     <- c(1999,11)
> HORIZON   <- c(26)
> download.rb()
> rb$cpi$F1999.Q4 <- make.rb.cpi()
> rb$kpix$F1999.Q4 <- make.rb.kpix()

```

5.5 Forecast origin 2000:Q1

```

> PATH      <- "upload/3905/"
> FILE      <- "dia42-50.xls"
> SHEETS    <- c(9,8)
> SKIP      <- c(67,67)
> ORIGIN    <- c(2000,1)
> START     <- c(2000,3)
> HORIZON   <- c(25)
> download.rb()
> rb$cpi$F2000.Q1 <- make.rb.cpi()
> rb$kpix$F2000.Q1 <- make.rb.kpix()

```

5.6 Forecast origin 2000:Q2

```

> PATH      <- "upload/4126/"
> FILE      <- "5053.xls"
> SHEETS    <- c(4,3)
> SKIP      <- c(63,63)
> ORIGIN    <- c(2000,2)
> START     <- c(2000,5)
> HORIZON   <- c(26)
> download.rb()

```

```
> rb$cpi$F2000.Q2 <- make.rb.cpi()
> rb$kpix$F2000.Q2 <- make.rb.kpix()
```

5.7 Forecast origin 2000:Q3

```
> PATH      <- "upload/4381/"
> FILE      <- "D47_54.xls"
> SHEETS    <- c(8,7)
> SKIP      <- c(73,73)
> ORIGIN    <- c(2000,3)
> START     <- c(2000,9)
> HORIZON   <- c(25)
> download.rb()
> rb$cpi$F2000.Q3 <- make.rb.cpi()
> rb$kpix$F2000.Q3 <- make.rb.kpix()
```

5.8 Forecast origin 2000:Q4

```
> PATH      <- "upload/4584/"
> FILE      <- "D48_56.xls"
> SHEETS    <- c(9,8)
> SKIP      <- c(74,74)
> ORIGIN    <- c(2000,4)
> START     <- c(2000,11)
> HORIZON   <- c(26)
> download.rb()
> rb$cpi$F2000.Q4 <- make.rb.cpi()
> rb$kpix$F2000.Q4 <- make.rb.kpix()
```

5.9 Forecast origin 2001:Q1

```
> PATH      <- "upload/4907/"
> FILE      <- "D_28_51.xls"
> SHEETS    <- c(24,23)
> SKIP      <- c(64,64)
> ORIGIN    <- c(2001,1)
> START     <- c(2001,3)
> HORIZON   <- c(25)
> download.rb()
> rb$cpi$F2001.Q1 <- make.rb.cpi()
> rb$kpix$F2001.Q1 <- make.rb.kpix()
```


5.10 Forecast origin 2001:Q2

```
> PATH      <- "upload/15300/"
> FILE      <- "infl2_D_18_31_R1.xls"
> SHEETS    <- c(14,13)
> SKIP      <- c(80,80)
> ORIGIN    <- c(2001,2)
> START     <- c(2001,5)
> HORIZON   <- c(26)
> download.rb()
> rb$cpi$F2001.Q2 <- make.rb.cpi()
> rb$kpix$F2001.Q2 <- make.rb.kpix()
```

5.11 Forecast origin 2001:Q3

```
> PATH      <- "upload/5854/"
> FILE      <- "IR01_3_D1_DR8.xls"
> SHEETS    <- c(36,35)
> SKIP      <- c(84,84)
> ORIGIN    <- c(2001,3)
> START     <- c(2001,9)
> HORIZON   <- c(25)
> download.rb()
> rb$cpi$F2001.Q3 <- make.rb.cpi()
> rb$kpix$F2001.Q3 <- make.rb.kpix()
```

5.12 Forecast origin 2001:Q4

```
> PATH      <- "upload/6036/"
> FILE      <- "infl4_D_1_42.xls"
> SHEETS    <- c(42,41)
> SKIP      <- c(63,63)
> ORIGIN    <- c(2001,4)
> START     <- c(2001,11)
> HORIZON   <- c(25)
> download.rb()
> rb$cpi$F2001.Q4 <- make.rb.cpi()
> rb$kpix$F2001.Q4 <- make.rb.kpix()
```

5.13 Forecast origin 2002:Q1

```
> PATH      <- "upload/6461/"
> FILE      <- "samtliga%20svenska.xls"
> SHEETS    <- c(3,2)
> SKIP      <- c(63,63)
```

```

> ORIGIN    <- c(2002,1)
> START     <- c(2002,3)
> HORIZON   <- c(26)
> download.rb()
> rb$cpi$F2002.Q1 <- make.rb.cpi()
> rb$kpix$F2002.Q1 <- make.rb.kpix()

```

5.14 Forecast origin 2002:Q2

```

> PATH      <- "upload/6711/"
> FILE      <- "2002_2_sve.xls"
> SHEETS    <- c(30,29)
> SKIP      <- c(63,63)
> ORIGIN    <- c(2002,2)
> START     <- c(2002,5)
> HORIZON   <- c(26)
> download.rb()
> rb$cpi$F2002.Q2 <- make.rb.cpi()
> rb$kpix$F2002.Q2 <- make.rb.kpix()

```

5.15 Forecast origin 2002:Q3

```

> PATH      <- "upload/7183/"
> FILE      <- "2002_3_sve.xls"
> SHEETS    <- c(3,2)
> SKIP      <- c(72,72)
> ORIGIN    <- c(2002,3)
> START     <- c(2002,9)
> HORIZON   <- c(26)
> download.rb()
> rb$cpi$F2002.Q3 <- make.rb.cpi()
> rb$kpix$F2002.Q3 <- make.rb.kpix()

```

5.16 Forecast origin 2002:Q4

```

> PATH      <- "upload/7319/"
> FILE      <- "2002_4_sve.xls"
> SHEETS    <- c(3,2)
> SKIP      <- c(74,74)
> ORIGIN    <- c(2002,4)
> START     <- c(2002,11)
> HORIZON   <- c(26)
> download.rb()
> rb$cpi$F2002.Q4 <- make.rb.cpi()
> rb$kpix$F2002.Q4 <- make.rb.kpix()

```

5.17 Forecast origin 2003:Q1

```
> PATH      <- "upload/19941/"
> FILE      <- "2003_1.xls"
> SHEETS    <- c(6,5)
> SKIP      <- c(102,66)
> ORIGIN    <- c(2003,1)
> START     <- c(2003,2)
> HORIZON   <- c(26)
> download.rb()
> rb$cpi$F2003.Q1 <- make.rb.cpi()
> rb$kpix$F2003.Q1 <- make.rb.kpix()
```

5.18 Forecast origin 2003:Q2

```
> PATH      <- "upload/19945/"
> FILE      <- "2003_2.xls"
> SHEETS    <- c(53,52)
> SKIP      <- c(104,69)
> ORIGIN    <- c(2003,2)
> START     <- c(2003,5)
> HORIZON   <- c(26)
> download.rb()
> rb$cpi$F2003.Q2 <- make.rb.cpi()
> rb$kpix$F2003.Q2 <- make.rb.kpix()
```

5.19 Forecast origin 2003:Q3

```
> PATH      <- "pagefolders/19949/"
> FILE      <- "2003_3.xls"
> SHEETS    <- c(62,61)
> SKIP      <- c(108,72)
> ORIGIN    <- c(2003,3)
> START     <- c(2003,9)
> HORIZON   <- c(25)
> download.rb()
> rb$cpi$F2003.Q3 <- make.rb.cpi()
> rb$kpix$F2003.Q3 <- make.rb.kpix()
```

5.20 Forecast origin 2003:Q4

```
> PATH      <- "pagefolders/19953/"
> FILE      <- "2003_4.xls"
> SHEETS    <- c(44,43)
> SKIP      <- c(111,75)
```

```

> ORIGIN    <- c(2003,4)
> START     <- c(2003,11)
> HORIZON   <- c(26)
> download.rb()
> rb$cpi$F2003.Q4 <- make.rb.cpi()
> rb$kpix$F2003.Q4 <- make.rb.kpix()

```

5.21 Forecast origin 2004:Q1

```

> PATH      <- "upload/Dokument_riksbank/Kat_publicerat/Rapporter/"
> FILE      <- "IR_2004_1_sv.xls"
> SHEETS    <- c(57,56)
> SKIP      <- c(115,115)
> ORIGIN    <- c(2004,1)
> START     <- c(2003,3)
> HORIZON   <- c(25)
> download.rb()
> rb$cpi$F2004.Q1 <- make.rb.cpi()
> rb$kpix$F2004.Q1 <- make.rb.kpix()

```

5.22 Forecast origin 2004:Q2

```

> PATH      <- "upload/Dokument_riksbank/Kat_publicerat/Rutor_IR/"
> FILE      <- "infl_2004_2_sve.xls"
> SHEETS    <- c(45,44)
> SKIP      <- c(81,81)
> ORIGIN    <- c(2004,2)
> START     <- c(2003,5)
> HORIZON   <- c(26)
> download.rb()
> rb$cpi$F2004.Q2 <- make.rb.cpi()
> rb$kpix$F2004.Q2 <- make.rb.kpix()

```

5.23 Forecast origin 2004:Q3

```

> PATH      <- "upload/Dokument_riksbank/Kat_publicerat/Rapporter/"
> FILE      <- "SamtligaSvenska.xls"
> SHEETS    <- c(55,54)
> SKIP      <- c(85,65)
> ORIGIN    <- c(2004,3)
> START     <- c(2003,9)
> HORIZON   <- c(25)
> download.rb()
> rb$cpi$F2004.Q3 <- make.rb.cpi()
> rb$kpix$F2004.Q3 <- make.rb.kpix()

```

5.24 Forecast origin 2004:Q4

```
> FILE      <- "2004_4SV.xls"
> SHEETS    <- c(68,67)
> SKIP      <- c(87,87)
> ORIGIN    <- c(2004,4)
> START     <- c(2003,11)
> HORIZON   <- c(26)
> download.rb()
> rb$cpi$F2004.Q4 <- make.rb.cpi()
> rb$kpix$F2004.Q4 <- make.rb.kpix()
```

5.25 Forecast origin 2005:Q1

```
> PATH      <- "pagefolders/18851/"
> FILE      <- "samtliga_svenska.xls"
> SHEETS    <- c(63,62)
> SKIP      <- c(66,64)
> ORIGIN    <- c(2005,1)
> START     <- c(2003,2)
> HORIZON   <- c(26)
> download.rb()
> rb$cpi$F2005.Q1 <- make.rb.cpi()
> rb$kpix$F2005.Q1 <- make.rb.kpix()
```

5.26 Forecast origin 2005:Q2

```
> PATH      <- "pagefolders/20354/"
> FILE      <- "sve_2005_2.xls"
> SHEETS    <- c(45,44)
> SKIP      <- c(65,65)
> ORIGIN    <- c(2005,2)
> START     <- c(2003,6)
> HORIZON   <- c(25)
> download.rb()
> rb$cpi$F2005.Q2 <- make.rb.cpi()
> rb$kpix$F2005.Q2 <- make.rb.kpix()
```

6 Konjunkturinstitutet's forecasts

6.1 Introduction

The inflation forecasts from Sveriges Riksbank have been made available by Marcus Widén at Konjunkturinstitutet as a Microsoft Excel file. It is not available on the web place of the institute. Although data in this case

is available in a single Excel file with multiple spread sheets there is still data that varies over forecast origins. First, the forecasts are in sheets 2–21. Second, the row at which the first forecast is located is different in different sheets. Third, difference in the forecast horizon may be up to 9 months.

As in the case of Sveriges Riksbank a set of functions are set up to create the data set. Also these functions utilise a number of variables, capitalised in the definitions of the functions, such as `SHEET`, `SKIP` etc. These are discussed below:

1. `ki2ts` read the relevant parts of a specified spread sheet using `read.xls` from package **gdata** and makes it into a time series object:

```
> ki2ts <- function()
+ {
+   ts(read.xls(FILE,header=FALSE,col.names=COLNAMES,
+               nrow=HORIZON,sheet=SHEET,skip=SKIP,
+               colClasses=c("NULL",NA,NA,"NULL","NULL",
+                             "NULL"),as.is=c(2,3)),
+   start=START,frequency=12)
+ }
```

2. `make.ki.cpi` `make.ki.kpix` executes `ki2ts` for the CPI and KPIX data series respectively and creates time series objects containing the CPI and KPIX forecasts and outcome data.

```
> make.ki.cpi <- function()
+ {
+   cpi <- ki2ts()[,"CPI"]
+   cpi <- ts.intersect(cpi,cpi.outcome)
+   dimnames(cpi)[[2]][1] <- "cpi.mode"
+   cpi
+ }
> make.ki.kpix <- function()
+ {
+   kpix <- ki2ts()[,"KPIX"]
+   kpix <- ts.intersect(kpix,kpix.outcome)
+   dimnames(kpix)[[2]][1] <- "kpix.mode"
+   kpix
+ }
```

Some of this input data is the same for all spread sheets:

```
> FILE <- "sifds/inst/extdata/ki.xls"
> COLNAMES <- c("X1","KPIX","CPI","X2","X3","X4")
```

However there is some input data which varies between spread sheets and which below is given specifically for each spread sheet:

SHEET The forecasts are available in sheets 2 – 21. rather than defining a counter that is increased by unity for each forecast origin, the variable **SHEET** is set to the appropriate number.

SKIP The number of rows before the first forecast in the relevant sheets varies over forecast origins. **SKIP** is given as the number of rows to skip in the sheet.

ORIGIN The origin is given as a tuple giving the year and quarter of the forecast origin.

START The date of the first (the one-step-ahead) forecast at the forecast origin. It is given as a tuple giving the year and month. In most years starting months are March, May, September and November, but not always.

HORIZON The *longest* forecast horizon varies between 21 and 30 and horizon is set to the appropriate horizon.

Finally, we produce a list of empty elements to contain the KI forecasts:

```
> ki.origins <- list(  
+ F2001.Q1=NULL,F2001.Q2=NULL,F2001.Q3=NULL,F2001.Q4=NULL,  
+ F2002.Q1=NULL,F2002.Q2=NULL,F2002.Q3=NULL,F2002.Q4=NULL,  
+ F2003.Q1=NULL,F2003.Q2=NULL,F2003.Q3=NULL,F2003.Q4=NULL,  
+ F2004.Q1=NULL,F2004.Q2=NULL,F2004.Q3=NULL,F2004.Q4=NULL,  
+ F2005.Q1=NULL,F2005.Q2=NULL)  
> ki <- list(cpi=ki.origins,kpix=ki.origins)
```

6.2 Forecast origin 2001:Q1

```
> SHEET <- 2  
> SKIP <- 16  
> ORIGIN <- c(2001,1)  
> START <- c(2001,4)  
> HORIZON <- 21  
> ki$cpi$F2001.Q1 <- make.ki.cpi()  
> ki$kpix$F2001.Q1 <- make.ki.kpix()
```

6.3 Forecast origin 2001:Q2

```
> SHEET <- 3  
> SKIP <- 19  
> ORIGIN <- c(2001,2)
```

```

> START    <- c(2001,7)
> HORIZON  <- 30
> ki$cpi$F2001.Q2 <- make.ki.cpi()
> ki$kpix$F2001.Q2 <- make.ki.kpix()

```

6.4 Forecast origin 2001:Q3

```

> SHEET    <- 4
> SKIP     <- 21
> ORIGIN   <- c(2001,3)
> START    <- c(2001,9)
> HORIZON  <- 27
> ki$cpi$F2001.Q3 <- make.ki.cpi()
> ki$kpix$F2001.Q3 <- make.ki.kpix()

```

6.5 Forecast origin 2001:Q4

```

> SHEET    <- 5
> SKIP     <- 21
> ORIGIN   <- c(2001,4)
> START    <- c(2001,12)
> HORIZON  <- 25
> ki$cpi$F2001.Q4 <- make.ki.cpi()
> ki$kpix$F2001.Q4 <- make.ki.kpix()

```

6.6 Forecast origin 2002:Q1

```

> SHEET    <- 6
> SKIP     <- 28
> ORIGIN   <- c(2002,1)
> START    <- c(2002,4)
> HORIZON  <- 21
> ki$cpi$F2002.Q1 <- make.ki.cpi()
> ki$kpix$F2002.Q1 <- make.ki.kpix()

```

6.7 Forecast origin 2002:Q2

```

> SHEET    <- 7
> SKIP     <- 31
> ORIGIN   <- c(2002,2)
> START    <- c(2002,7)
> HORIZON  <- 30
> ki$cpi$F2002.Q2 <- make.ki.cpi()
> ki$kpix$F2002.Q2 <- make.ki.kpix()

```


6.8 Forecast origin 2002:Q3

```
> SHEET    <- 8
> SKIP      <- 33
> ORIGIN    <- c(2002,3)
> START     <- c(2002,9)
> HORIZON   <- 26
> ki$cpi$F2002.Q3 <- make.ki.cpi()
> ki$kpix$F2002.Q3 <- make.ki.kpix()
```

6.9 Forecast origin 2002:Q4

```
> SHEET    <- 9
> SKIP      <- 37
> ORIGIN    <- c(2002,4)
> START     <- c(2003,1)
> HORIZON   <- 24
> ki$cpi$F2002.Q4 <- make.ki.cpi()
> ki$kpix$F2002.Q4 <- make.ki.kpix()
```

6.10 Forecast origin 2003:Q1

```
> SHEET    <- 10
> SKIP      <- 40
> ORIGIN    <- c(2003,1)
> START     <- c(2003,4)
> HORIZON   <- 21
> ki$cpi$F2003.Q1 <- make.ki.cpi()
> ki$kpix$F2003.Q1 <- make.ki.kpix()
```

6.11 Forecast origin 2003:Q2

```
> SHEET    <- 11
> SKIP      <- 43
> ORIGIN    <- c(2003,2)
> START     <- c(2003,7)
> HORIZON   <- 30
> ki$cpi$F2003.Q2 <- make.ki.cpi()
> ki$kpix$F2003.Q2 <- make.ki.kpix()
```

6.12 Forecast origin 2003:Q3

```
> SHEET    <- 12
> SKIP      <- 45
> ORIGIN    <- c(2003,3)
```

```

> START    <- c(2003,9)
> HORIZON  <- 28
> ki$cpi$F2003.Q3 <- make.ki.cpi()
> ki$kpix$F2003.Q3 <- make.ki.kpix()

```

6.13 Forecast origin 2003:Q4

```

> SHEET    <- 14
> SKIP     <- 49
> ORIGIN    <- c(2003,4)
> START     <- c(2004,1)
> HORIZON   <- 24
> ki$cpi$F2003.Q4 <- make.ki.cpi()
> ki$kpix$F2003.Q4 <- make.ki.kpix()

```

6.14 Forecast origin 2004:Q1

```

> SHEET    <- 15
> SKIP     <- 52
> ORIGIN    <- c(2004,1)
> START     <- c(2004,4)
> HORIZON   <- 21
> ki$cpi$F2004.Q1 <- make.ki.cpi()
> ki$kpix$F2004.Q1 <- make.ki.kpix()

```

6.15 Forecast origin 2004:Q2

```

> SHEET    <- 16
> SKIP     <- 55
> ORIGIN    <- c(2004,2)
> START     <- c(2004,7)
> HORIZON   <- 29
> ki$cpi$F2004.Q2 <- make.ki.cpi()
> ki$kpix$F2004.Q2 <- make.ki.kpix()

```

6.16 Forecast origin 2004:Q3

```

> SHEET    <- 17
> SKIP     <- 57
> ORIGIN    <- c(2004,3)
> START     <- c(2004,9)
> HORIZON   <- 28
> ki$cpi$F2004.Q3 <- make.ki.cpi()
> ki$kpix$F2004.Q3 <- make.ki.kpix()

```

6.17 Forecast origin 2004:Q4

```
> SHEET    <- 19
> SKIP      <- 61
> ORIGIN    <- c(2004,4)
> START     <- c(2005,1)
> HORIZON   <- 24
> ki$cpi$F2004.Q4 <- make.ki.cpi()
> ki$kpix$F2004.Q4 <- make.ki.kpix()
```

6.18 Forecast origin 2005:Q1

```
> SHEET    <- 20
> SKIP      <- 64
> ORIGIN    <- c(2005,1)
> START     <- c(2005,4)
> HORIZON   <- 21
> ki$cpi$F2005.Q1 <- make.ki.cpi()
> ki$kpix$F2005.Q1 <- make.ki.kpix()
```

6.19 Forecast origin 2005:Q1

```
> SHEET    <- 21
> SKIP      <- 67
> ORIGIN    <- c(2005,1)
> START     <- c(2005,7)
> HORIZON   <- 30
> ki$cpi$F2005.Q2 <- make.ki.cpi()
> ki$kpix$F2005.Q2 <- make.ki.kpix()
```

7 Saving the data

We finally save all the different forecasts from RB and KI in a single R-data file:

```
> save(rb,ki,cpi.outcome,kpix.outcome,file="sifds/data/sifds.rda")
```

The two objects `rb` and `ki` consists of two lists respectively; `cpi` and `kpix`. These two lists in turn consists of lists of time series objects, each which correspond to a forecast origin. Also the outcome data for CPI and KPIX are two time series objects. Here we just exemplify a CPI forecast from RB (1999:Q2), KI (2001:Q1) and the CPI outcome data:

```
> rb$cpi$F1999.Q2
```

		cpi.l90	cpi.l75	cpi.l50	cpi.mode	cpi.u50	cpi.u75
May 1999		-0.51720	-0.447195	-0.4072	-0.11720	0.1728	0.2128
Jun 1999		-0.39870	-0.317685	-0.2647	0.03758	0.3417	0.3943
Jul 1999		-0.50024	-0.406862	-0.3396	-0.02440	0.2946	0.3612
Aug 1999		-0.05490	0.052351	0.1355	0.46410	0.7987	0.8809
Sep 1999		0.05828	0.181079	0.2818	0.62435	0.9753	1.0749
Oct 1999		0.09137	0.231563	0.3517	0.70878	1.0768	1.1958
Nov 1999		0.13983	0.299483	0.4410	0.81323	1.1993	1.3396
Dec 1999		0.13757	0.318962	0.4840	0.87205	1.2769	1.4411
Jan 2000		0.20564	0.411298	0.6022	1.00673	1.4314	1.6218
Feb 2000		0.09049	0.323212	0.5425	0.96423	1.4096	1.6291
Mar 2000		0.05571	0.318591	0.5691	1.00869	1.4758	1.7273
Apr 2000		-0.03791	0.258565	0.5432	1.00150	1.4914	1.7783
May 2000		-0.14583	0.188031	0.5101	0.98784	1.5017	1.8275
Jun 2000		-0.25138	0.124060	0.4870	0.98511	1.5240	1.8928
Jul 2000		-0.34399	0.049171	0.4291	0.95170	1.5138	1.8993
Aug 2000		-0.42978	-0.018052	0.3796	0.92795	1.5142	1.9172
Sep 2000		-0.50196	-0.070785	0.3455	0.92078	1.5322	1.9535
Oct 2000		-0.54385	-0.092316	0.3434	0.94701	1.5847	2.0252
Nov 2000		-0.55729	-0.084440	0.3716	1.00495	1.6700	2.1305
Dec 2000		-0.58166	-0.086473	0.3908	1.05540	1.7490	2.2304
Jan 2001		-0.60774	-0.089179	0.4104	1.10769	1.8311	2.3344
Feb 2001		-0.60067	-0.057617	0.4653	1.19691	1.9514	2.4776
Mar 2001		-0.60539	-0.036700	0.5106	1.27826	2.0651	2.6152
Apr 2001		-0.59762	-0.002071	0.5708	1.37623	2.1969	2.7720
May 2001		-0.59612	0.027539	0.6272	1.47223	2.3282	2.9293
Jun 2001		-0.60707	0.046045	0.6737	1.56032	2.4530	3.0815
		cpi.u90	cpi.outcome				
May 1999		0.2828	0.1				
Jun 1999		0.4753	0.4				
Jul 1999		0.4546	0.2				
Aug 1999		0.9883	0.7				
Sep 1999		1.1980	1.0				
Oct 1999		1.3365	0.9				
Nov 1999		1.5002	0.9				
Dec 1999		1.6238	1.3				
Jan 2000		1.8294	0.5				
Feb 2000		1.8645	0.9				
Mar 2000		1.9939	1.0				
Apr 2000		2.0796	0.7				
May 2000		2.1677	1.0				
Jun 2000		2.2762	0.8				
Jul 2000		2.3000	0.8				
Aug 2000		2.3361	0.9				

Sep 2000	2.3913	0.9
Oct 2000	2.4827	1.0
Nov 2000	2.6088	1.3
Dec 2000	2.7303	1.0
Jan 2001	2.8569	1.5
Feb 2001	3.0236	1.4
Mar 2001	3.1860	1.7
Apr 2001	3.3685	2.6
May 2001	3.5528	2.8
Jun 2001	3.7332	2.7

```
> ki$cpi$F2001.Q1
```

	cpi.mode	cpi.outcome
Apr 2001	1.81	2.6
May 2001	1.48	2.8
Jun 2001	1.40	2.7
Jul 2001	1.58	2.7
Aug 2001	1.54	2.9
Sep 2001	1.53	3.0
Oct 2001	1.46	2.5
Nov 2001	1.40	2.5
Dec 2001	1.50	2.7
Jan 2002	1.50	2.7
Feb 2002	1.41	2.6
Mar 2002	1.34	2.7
Apr 2002	1.37	2.3
May 2002	1.43	1.8
Jun 2002	1.54	1.8
Jul 2002	1.65	2.0
Aug 2002	1.73	1.8
Sep 2002	1.74	1.7
Oct 2002	1.70	2.3
Nov 2002	1.66	2.0
Dec 2002	1.75	2.1

```
> cpi.outcome
```

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
1999					0.1	0.4	0.2	0.7	1.0	0.9	0.9	1.3
2000	0.5	0.9	1.0	0.7	1.0	0.8	0.8	0.9	0.9	1.0	1.3	1.0
2001	1.5	1.4	1.7	2.6	2.8	2.7	2.7	2.9	3.0	2.5	2.5	2.7
2002	2.7	2.6	2.7	2.3	1.8	1.8	2.0	1.8	1.7	2.3	2.0	2.1
2003	2.7	3.3	3.0	2.2	1.8	1.6	1.7	1.6	1.5	1.3	1.3	1.3
2004	0.7	-0.4	-0.2	0.2	0.6	0.4	0.6	0.5	0.5	0.8	0.4	0.3

2005	0.0	0.7	0.1	0.3	0.1	0.6	0.3	0.6	0.6	0.5	0.8	0.9
2006	0.6	0.6	1.1	1.5	1.6	1.5	1.7	1.6	1.5	1.3	1.7	1.6
2007	1.9	2.0	1.9	1.9	1.7	1.9	1.9					

8 Functions to facilitate access to the data

In the following a set of functions that will facilitate the access of the data is set up. These functions create entire vectors of forecast errors of the same forecast horizon. The function `rb.error` basically just do that for a specified horizon (by default one month) for the RB forecasts. The functions `rb.cpi.errors` and `rb.kpix.errors` then applies this function to the entire list) either CPI or KPIX) of forecast origins. Only one argument is need and that is the forecast horizon, which defaults to one moth. If the horizon is not an integer between 1 and 25 (inclusive) an error message is produced. The output is a time series object and quarterly data with starting date 1999:Q1:

```
> rb.error <- function(x,horizon=c(1)) {
+   err <- x[horizon,4] - x[horizon,8]
+   err
+ }
> rb.cpi.errors <- function(horizon=1) {
+   if (horizon < 1 || horizon > 25) stop("Unfeasible horizon!\n")
+   answer <- mapply(rb.error,rb$cpi,
+     MoreArgs=list(horizon),USE.NAMES=FALSE)
+   names(answer) <- NULL
+   answer <- ts(answer,start=c(1999,2),frequency=4)
+   answer
+ }
> rb.kpix.errors <- function(horizon=1) {
+   if (horizon < 1 || horizon > 25) stop("Unfeasible horizon!\n")
+   answer <- mapply(rb.error,rb$kpix,
+     MoreArgs=list(horizon),USE.NAMES=FALSE)
+   names(answer) <- NULL
+   answer <- ts(answer,start=c(1999,2),frequency=4)
+   answer
+ }
```

Here are two examples of usage and output. The first one with default horizon and the second where the horizon is specified:

```
> rb.cpi.errors()

      Qtr1      Qtr2      Qtr3      Qtr4
1999      -0.21720 -0.13000  0.01000
```

```

2000  0.51000  0.26431  0.36000  0.23000
2001 -0.19000  0.10000  0.01000  0.07000
2002  0.12000  0.25000  0.27000  0.26000
2003 -0.08000  0.30000 -0.05294  0.37000
2004 -3.28000 -1.35000 -0.94000 -0.60000
2005 -2.94000 -1.10000

```

```
> rb.kpix.errors(12)
```

```

      Qtr1    Qtr2    Qtr3    Qtr4
1999      1.1900  1.0100  0.9600
2000  0.3600 -1.0486 -1.2400 -1.0900
2001 -1.2400 -0.5000 -0.1700 -0.2300
2002 -0.9100 -0.1800 -0.3000  0.0600
2003  0.2600  0.0500  0.2553 -0.0200
2004  1.0100  0.0800  0.3000  0.0000
2005 -0.2400 -0.2000

```

The functions `ki.error`, `ki.cpi.errors`, `ki.kpix.errors` do the same for the KI forecasts, but now the forecast horizon is restricted to be between 1 and 21 months ahead (inclusive):

```

> ki.error <- function(x,horizon=c(1)) {
+   err <- x[horizon,1] - x[horizon,2]
+   err
+ }
> ki.cpi.errors <- function(horizon=1) {
+   if (horizon < 1 || horizon > 21) stop("Unfeasible horizon!\n")
+   answer <- mapply(ki.error,ki$cpi,
+     MoreArgs=list(horizon),USE.NAMES=FALSE)
+   names(answer) <- NULL
+   answer <- ts(answer,start=c(2001,1),frequency=4)
+   answer
+ }
> ki.kpix.errors <- function(horizon=1) {
+   if (horizon < 1 || horizon > 21) stop("Unfeasible horizon!\n")
+   answer <- mapply(ki.error,ki$kpix,
+     MoreArgs=list(horizon),USE.NAMES=FALSE)
+   names(answer) <- NULL
+   answer <- ts(answer,start=c(2001,1),frequency=4)
+   answer
+ }

```

The same forecast horizons as above but made by KI as examples. Note the different starting date:

```
> ki.cpi.errors()
```

	Qtr1	Qtr2	Qtr3	Qtr4
2001	-0.79	0.02	-0.03	0.50
2002	-0.22	0.35	0.30	-0.24
2003	0.68	-0.27	0.19	-0.04
2004	-0.11	0.18	0.14	0.59
2005	0.05	0.31		

```
> ki.kpix.errors(12)
```

	Qtr1	Qtr2	Qtr3	Qtr4
2001	-1.96	-0.51	-0.30	0.05
2002	-1.05	-0.23	-0.40	0.18
2003	0.54	-0.29	0.06	0.42
2004	0.59	0.52	0.33	0.18
2005	-0.42	-0.44		

References

- Berg, C. (2000). “Inflation forecast targeting: The Swedish experience.” In M. I. Blejer, A. Ize, A. M. Leone, and S. Werlang (Eds.), *Inflation targeting in practice: Strategic and operational issues and application to emerging market economies*, 28–36, International Monetary Fund.
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- R Development Core Team (2009). *R: A Language and Environment for Statistical Computing*. R Foundation for Statistical Computing, Vienna, Austria, ISBN 3-900051-07-0.
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APPENDIX: R manual to “Package ‘sifds’”

Package ‘sifds’

March 30, 2010

Title Swedish inflation forecast data set

Description A data set with Swedish inflation forecasts and inflation outcome 1999:Q2-2005:Q2.

Version 0.9

Date 2010-03-30

Depends R (>= 2.10.0), utils, gdata

LazyLoad yes

LazyData yes

Type Package

Author Michael Lundholm

Maintainer Michael Lundholm <mlu@ne.su.se>

License GPL (>=3)

URL <http://people.su.se/~lundh/data.html>

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`cpi.outcome`
Swedish CPI inflation 1999:M05-2007:M07

Description

Annual changes in the Swedish inflation measured by CPI 1999:M05-2007:M07.

Usage

```
cpi.outcome
```

Format

A time series object with frequency 12 containing 99 observations with starting date 1999:M05.

Author(s)

Michael Lundholm

`ki`
Konjunkturinstitutet's forecasts

Description

Forecasts from Konjunkturinstitutet of the inflation measured by CPI and KPIX with forecast origins 2001:Q1-2005:Q2. At each of the 18 forecast origin, point forecasts 1-21 months ahead as well as outcome data.

Usage

```
ki
```

Usage

```
ki$cpi
```

Usage

```
ki$kpix
```

Format

`ki` consists of two lists `cpi` and `kpix`, each of which is a list of 25 time series objects, one for each forecast origin 1999:Q1-2005:Q2. Each of the time series objects consists of 2 variables; point forecast and outcome.

Author(s)

Michael Lundholm

`ki.cpi.errors`*Generates forecast errors for the KI forecasts for CPI*

Description

Generates a sequence of 18 forecast errors 2001:Q1-2005:Q2 for the KI forecasts for CPI for a forecast horizon 1-21 months ahead. The default horizon is one month.

Usage

```
ki.cpi.errors(horizon=1)
```

Arguments

<code>horizon</code>	An integer within the feasible forecast horizon 1-21 months. If the forecast horizon is unfeasible no output is produced and a warning issued.
----------------------	--

Value

A time series object with 18 values, starting date 2001:Q1 and frequency 4.

Author(s)

Michael Lundholm

Examples

```
# Load the sifds
data(sifds)
# Produce one month ahead forecast errors
ki.cpi.errors()
# Produce 12 months ahead forecast errors
ki.cpi.errors(12)
```

<code>ki.kpix.errors</code>	<i>Generates forecast errors for the KI forecasts for KPIX</i>
-----------------------------	--

Description

Generates a sequence of 18 forecast errors 2001:Q1-2005:Q2 for the KI forecasts for KPIX for a forecast horizon 1-21 months ahead. The default horizon is one month.

Usage

```
ki.kpix.errors(horizon=1)
```

Arguments

<code>horizon</code>	An integer within the feasible forecast horizon 1-21 months. If the forecast horizon is unfeasible no output is produced and a warning issued.
----------------------	--

Value

A time series object with 18 values, starting date 2001:Q1 and frequency 4.

Author(s)

Michael Lundholm

Examples

```
# Load the sifds
data(sifds)
# Produce one month ahead forecast errors
ki.kpix.errors()
# Produce 12 months ahead forecast errors
ki.kpix.errors(12)
```

<code>kpix.outcome</code>	<i>Swedish KPIX inflation 1999:M05-2007:M07</i>
---------------------------	---

Description

Annual changes in the Swedish inflation measured by CPI 1999:M05-2007:M07.

Usage

```
kpix.outcome
```

Format

A time series object with frequency 12 containing 99 observations with starting date 1999:M05.

Author(s)

Michael Lundholm

rb

Sveriges Riksbank's forecasts

Description

Forecasts from Sveriges Riksbank of the inflation measured by CPI and KPIX with forecast origins 1999:Q1-2005:Q2. At each of the 25 forecast origins, point forecast and three interval forecast for different coverage probabilities 1-25 months ahead and outcome data.

Usage

`rb`

Usage

`rb$cpi`

Usage

`rb$kpix`

Format

`rb` consists of two lists `cpi` and `kpix`, each of which is a list of 25 time series objects, one for each forecast origin 1999:Q1-2005:Q2. Each of the time series objects consists of 8 variables; lower 50% interval, lower 75% interval, lower 90% interval, mode, upper 90% interval, upper 75% interval, upper 50% interval and outcome.

Author(s)

Michael Lundholm

rb.cpi.errors	<i>Generates forecast errors for the RB forecasts for CPI</i>
---------------	---

Description

Generates a sequence of 25 forecast errors 1999:Q2-2005:Q2 for the RB forecasts for CPI for a forecast horizon 1-25 months ahead. The default horizon is one month.

Usage

```
rb.cpi.errors(horizon=1)
```

Arguments

horizon	An integer within the feasible forecast horizon 1-25 months. If the forecast horizon is unfeasible no output is produced and a warning issued.
---------	--

Value

A time series object with 25 values, starting date 1999:Q2 and frequency 4.

Author(s)

Michael Lundholm

Examples

```
# Load the sifds
data(sifds)
# Produce one month ahead forecast errors
rb.cpi.errors()
# Produce 12 months ahead forecast errors
rb.cpi.errors(12)
```

rb.kpix.errors	<i>Generates forecast errors for the RB forecasts for KPIX</i>
----------------	--

Description

Generates a sequence of 25 forecast errors 1999:Q2-2005:Q2 for the RB forecasts for KPIX for a forecast horizon 1-25 months ahead. The default horizon is one month.

Usage

```
rb.kpix.errors(horizon=1)
```

Arguments

horizon An integer within the feasible forecast horizon 1-25 months. If the forecast horizon is unfeasible no output is produced and a warning issued.

Value

A time series object with 25 values, starting date 1999:Q2 and frequency 4.

Author(s)

Michael Lundholm

Examples

```
# Load the sifds
data(sifds)
# Produce one month ahead forecast errors
rb.kpix.errors()
# Produce 12 months ahead forecast errors
rb.kpix.errors(12)
```

sifds

Swedish inflation forecast data set

Description

A package containing data sets consisting of 25 forecasts (1999-2005) by Sveriges Riksbank (RB) and 18 forecasts (2001-2005) by Konjunkturinstitutet (KI) for Swedish inflation rates measured as CPI and KPIX. Lundholm (2010) contains a detailed description sources and how the data set is constructed.

Usage

```
data(sifds)
```

Author(s)

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References

Lundholm, M., (2010), **sifds**: Swedish inflation forecast data set 1999:Q2-2005:Q2, Research papers in economics 2010:4, Department of Economics, Stockholm University (<http://swopec.hhs.se>).

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