Lock-In Avoidance and Quality Assurance

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R in Finance
Chicago
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Outline

(By example – not a comprehensive treatment)

1. Lock-In Avoidance
   - setRNG
   - tframe
   - padi
   - TSdbi
2. Quality Assurance
   - automateR

What do I mean by Lock-In

- tied to legacy programs with no easy way to advance
- vender or lock-in to your own programs

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- package has tests to verify that the RNG has not changed

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- . . . but has been useful in R too:
- ts, mts, zoo, xts, its, tis, timeSeries
- tframePlus
- calculations / models based on sequence not time frame
- tframe(y) ← tframe(x)
- some end-user utilities recently moved to package tfplot

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- so, the vendor / version can be easily replaced
- largely replaced by TSfame – but the idea could be useful in other contexts.

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TSdbi `http://tsdbi.r-forge.r-project.org/`

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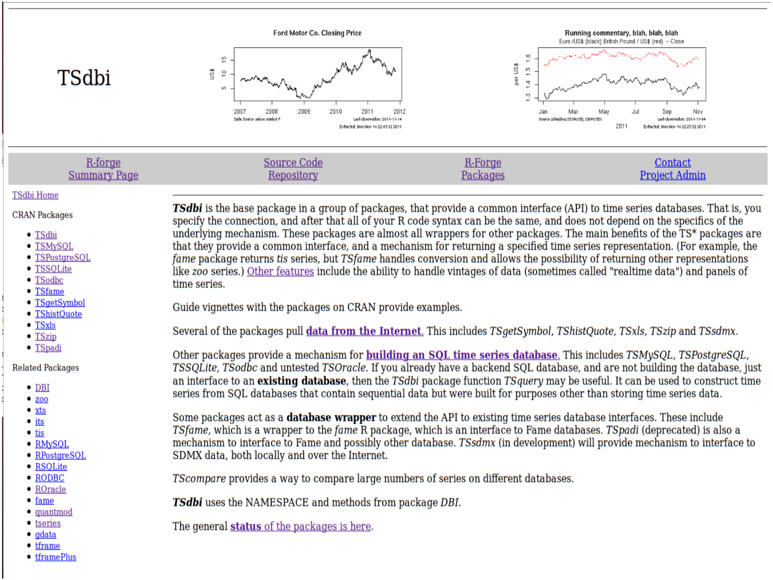
Ford Motor Co. Closing Price
US$
5
10
15
2007
2008
2009
2010
2011
2012
Data Source: yahoo symbol F
Last observation: 2011-11-14
Extracted: Mon Nov 14 22:45:12 2011
Running commentary, blah, blah, blah
Euro /US$ (black) British Pound / US$ (red) - Close
per US$
1.3
1.4
1.5
1.6
Jan
Mar
May
Jul
Sep
Nov
Source: pitrading (EURUSD, GBPUSD)
2011
Last observation: 2011-11-04
Extracted: Mon Nov 14 22:27:52 2011

TSdbi

R-forge Summary Page | Source Code Repository | R-Forge Packages | Contact Project Admin

TSdbi Home

CRAN Packages

- TSdbi
- TSMySQL
- TSPostgreSQL
- TSSQLite
- TSodbc
- TSfame
- TSgetSymbol
- TShistQuote
- TSxls
- TSzip
- TSpadi

Related Packages

- DBI
- zoo
- xts
- its
- tis
- RMySQL
- RPostgreSQL
- RSQLite
- RODBC
- ROracle
- fame
- quantmod
- tseries
- gdata
- tframe
- tframePlus

TSdbi is the base package in a group of packages, that provide a common interface (API) to time series databases. That is, you specify the connection, and after that all of your R code syntax can be the same, and does not depend on the specifics of the underlying mechanism. These packages are almost all wrappers for other packages. The main benefits of the TS* packages are that they provide a common interface, and a mechanism for returning a specified time series representation. (For example, the *fame* package returns *tis* series, but *TSfame* handles conversion and allows the possibility of returning other representations like *zoo* series.) Other features include the ability to handle vintages of data (sometimes called "realtime data") and panels of time series.

Guide vignettes with the packages on CRAN provide examples.

Several of the packages pull **data from the Internet.** This includes *TSgetSymbol*, *TShistQuote*, *TSxls*, *TSzip* and *TSsdmx*.

Other packages provide a mechanism for **building an SQL time series database.** This includes *TSMySQL*, *TSPostgreSQL*, *TSSQLite*, *TSodbc* and untested *TSOracle*. If you already have a backend SQL database, and are not building the database, just an interface to an **existing database**, then the *TSdbi* package function *TSquery* may be useful. It can be used to construct time series from SQL databases that contain sequential data but were built for purposes other than storing time series data.

Some packages act as a **database wrapper** to extend the API to existing time series database interfaces. These include *TSfame*, which is a wrapper to the *fame* R package, which is an interface to Fame databases. *TSpadi* (deprecated) is also a mechanism to interface to Fame and possibly other database. *TSsdmx* (in development) will provide mechanism to interface to SDMX data, both locally and over the Internet.

TScompare provides a way to compare large numbers of series on different databases.

TSdbi uses the NAMESPACE and methods from package *DBI*.

The general **status** of the packages is here.

API and time representation

- origin: SQL time series db
    - similarity with padi and fame
- led to standardized time series database interface (TSdbi)
- (I use economic not financial data)
- flexible WRT time series representation
- the API is defined by package TSdbi
- explanation by example:

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example 1 - TSconnect, TSget

- connect to a database

```
require("TSfame")
con <- TSconnect("fameServer", dbname=etsmfacansim,
    service = "2959", host = "ets", stopOnFail = TRUE)
```

- or

```
require("TSpadi")
con <- TSconnect("padi", dbname="ets")
```

- or

```
require("TSMySQL")
con <- TSconnect("MySQL",dbname="ets")
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- or PostgreSQL, SQLLite, ODBC, (Oracle)
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z <- TSget(serIDs="V122707", con=con)
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tfplot(ytoypc(z))
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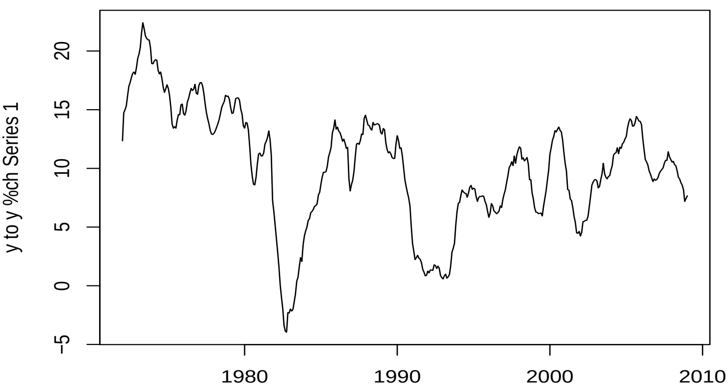
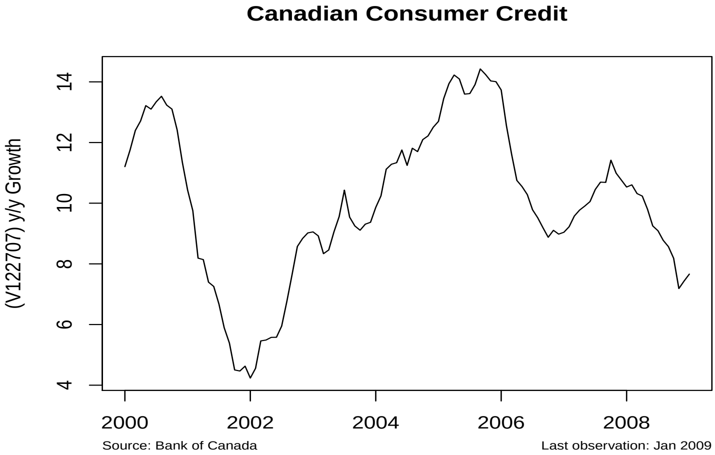


example 1

```
tfplot(ytoypc(z), start=c(2000,1), ylab="(V122707) y/y Growth",
    Title="Canadian Consumer Credit",
    lastObs=TRUE, source="Source: Bank of Canada")
```



example 1

- or specify the time series representation

```
z <- TSget(serIDs="V122707", con=con,
           TSrepresentation="zoo")
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- can set defaults for connection and representation

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z <- TSget("V122707")
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SQL plugins

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- SQL: A, S, Q, M, W, B, D, U(minutely), I(irregular with a date), T(irregular with a date and time)
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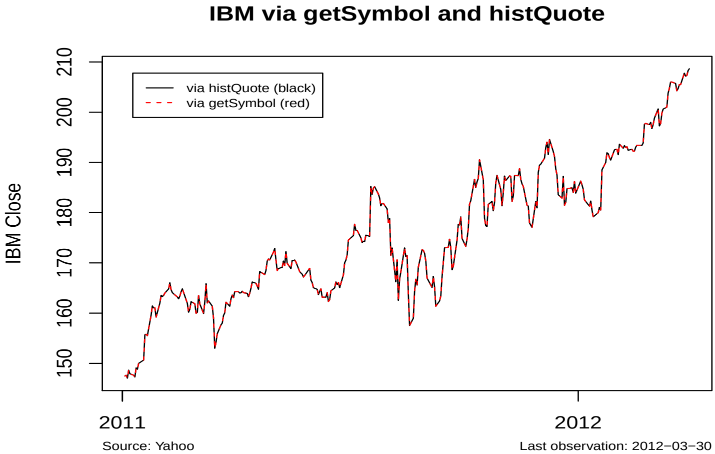
example 2 - TSgetSymbol and TShistQuote

```
require("TSgetSymbol")
require("TShistQuote")

ya1 <- TSconnect("getSymbol", dbname="yahoo")
ya2 <- TSconnect("histQuote", dbname="yahoo")

ibmC1 <- TSget("ibm", ya1, quote = "Close", start="2011-01-03")
ibmC2 <- TSget("ibm", ya2, quote = "Close", start="2011-01-03")
```

- zoo indexes are of different classes: Date vs POSIXct; this fixes it:
  `tframe(ibmC2) <- tframe(ibmC1)`

example 2 - TSgetSymbol and TShistQuote

```
tfplot(ibmC2, ibmC1, ylab="IBM Close", source="Source: Yahoo",
    Title="IBM via getSymbol and histQuote", lastObs=TRUE,
    legend=c("via histQuote (black)", "via getSymbol (red)"))
```



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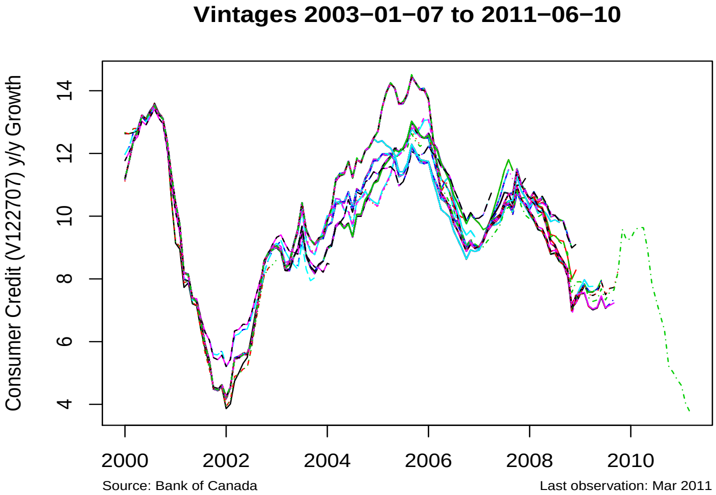
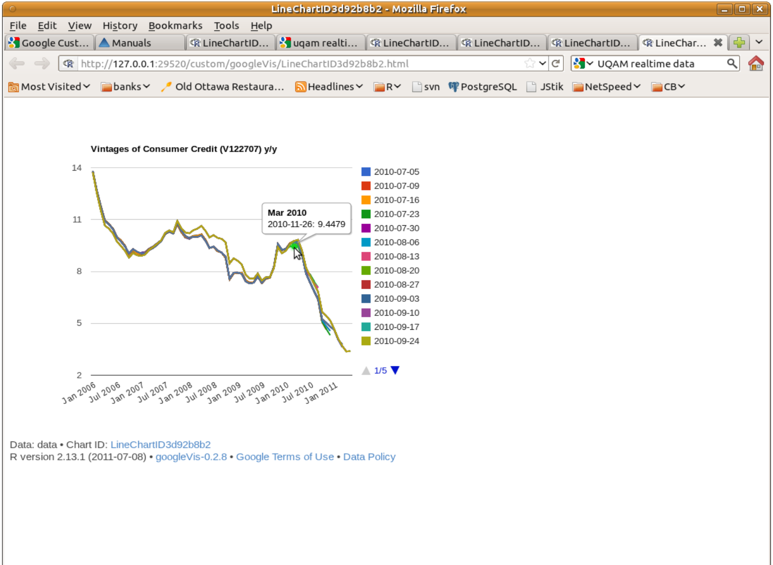
Vintage (Realtime) Data



identifying vintage outliers

- googleviz


LineChartID3d92b8b2 - Mozilla Firefox
File Edit View History Bookmarks Tools Help
Google Cust... Manuals LineChartID... uqam realti... LineChartID... LineChartID... LineChartID... LineChar...
http://127.0.0.1:29520/custom/googleVis/LineChartID3d92b8b2.html
UQAM realtime data
Most Visited banks Old Ottawa Restaura... Headlines R svn PostgreSQL JStik NetSpeed CB
Vintages of Consumer Credit (V122707) y/y
14
11
8
5
2
Jan 2006
Jul 2006
Jan 2007
Jul 2007
Jan 2008
Jul 2008
Jan 2009
Jul 2009
Jan 2010
Jul 2010
Jan 2011
Mar 2010
2010-11-26: 9.4479
2010-07-05
2010-07-09
2010-07-16
2010-07-23
2010-07-30
2010-08-06
2010-08-13
2010-08-20
2010-08-27
2010-09-03
2010-09-10
2010-09-17
2010-09-24
1/5

Data: data • Chart ID: LineChartID3d92b8b2
R version 2.13.1 (2011-07-08) • googleVis-0.2.8 • Google Terms of Use • Data Policy

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- examples to help avoid lock-in / leverage with vendors
- lowest common denominator
- much additional functionality in many wrapped packages
- but: TSexists, TSdates, TSput, TSreplace, TSdelete
- TSdescription, TSdoc, TSlabel, TSsource, TSvintages, . . .
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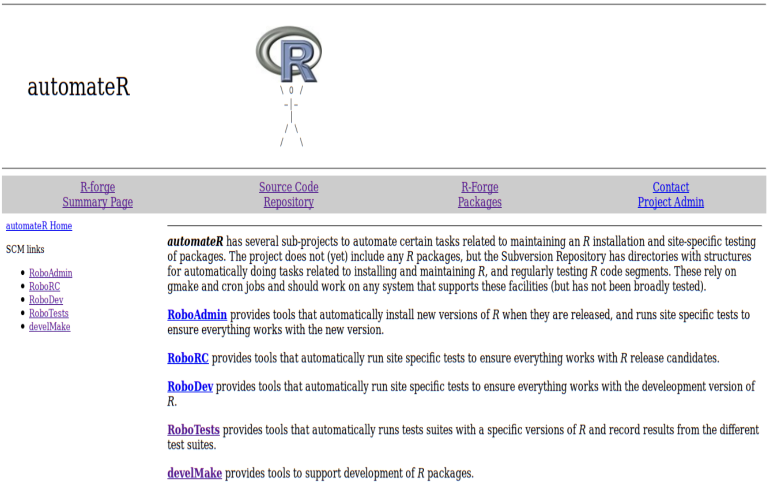
automateR

http://automater.r-forge.r-project.org/

R-forge automateR



automateR

[R-forge Summary Page] [Source Code Repository] [R-Forge Packages] [Contact Project Admin]

automateR Home

SCM links

- RoboAdmin
- RoboRC
- RoboDev
- RoboTests
- develMake

automateR has several sub-projects to automate certain tasks related to maintaining an *R* installation and site-specific testing of packages. The project does not (yet) include any *R* packages, but the Subversion Repository has directories with structures for automatically doing tasks related to installing and maintaining *R*, and regularly testing *R* code segments. These rely on gmake and cron jobs and should work on any system that supports these facilities (but has not been broadly tested).

RoboAdmin provides tools that automatically install new versions of *R* when they are released, and runs site specific tests to ensure everything works with the new version.

RoboRC provides tools that automatically run site specific tests to ensure everything works with *R* release candidates.

RoboDev provides tools that automatically run site specific tests to ensure everything works with the develeopment version of *R*.

RoboTests provides tools that automatically runs tests suites with a specific versions of *R* and record results from the different test suites.

develMake provides tools to support development of *R* packages.

automateR

http://automater.r-forge.r-project.org/

- make files / cron jobs
- (no R packages)

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http://automater.r-forge.r-project.org/

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develMake

- supports development of multiple R packages
- simplified from R News article.
- package tests/* first, then build and check
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- make
- make -j
- status: working, stable (one main user, gmake, Ubuntu)
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- context
  - large organizations with IT departments
  - users do not have/want responsibility/control of installing upgrades
  - upgrading is done "hesitantly" by IT
  - users do not have root privileges, cannot install system libraries, etc.
  - users depend on system administrators to install R and libraries
  - system administrators are paranoid about stability
  - site specific testing is usual
  - path setting to select an R version is something users can do
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- run site specific tests (as for RoboAdmin)
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