# Release Notes for Financial Toolbox™

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The MathWorks, Inc.
3 Apple Hill Drive
Natick, MA 01760-2098

For contact information about worldwide offices, see the MathWorks Web site.

*Release Notes for Financial Toolbox™*

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No New Features or Changes

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## R2006b



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# R2013a

Version: 5.1
New Features: Yes
Bug Fixes: No

## Cash flow plot function

Graphical representation for cash flows using `cfplot`.

# Financial Time Series Tool (`ftstool`) import of Excel XLSX files on Linux and Mac OS X

Support for `ftstool` import of Excel® XLSX files on Linux® and Mac OS X.

## Cutting-plane solver added to `PortfolioCVaR` object

New solver option (`'cuttingplane'`) for `PortfolioCVaR` object for conditional value-at-risk (CVaR) portfolio optimization. For more information, see `setSolver`.

# transprobbytotals errors when using the algorithm input argument

**Compatibility Considerations: Yes**

The 'totals' input argument to transprobbytotals is typically generated by transprob. Because transprob includes an 'algorithm' field in this structure since R2011b, you no longer need to specify the 'algorithm' argument using a name-value pair when calling transprobbytotals. If you specify an 'algorithm' argument as a name-value pair when calling transprobbytotals, you now receive an error.

## Compatibility Considerations

Specifying the'algorithm' as a name-value pair argument to transprobbytotals now causes an error. If you started using this functionality in R2011b or later, most likely you don't have to take any action. If you have used this functionality before R2011b, make sure you remove the 'algorithm' name-value pair from calls to transprobbytotals, and that the 'totals' input argument to transprobbytotals contains an'algorithm' field indicating the desired algorithm. In most cases, the latter can be achieved by recreating the 'totals' structure with a call to transprob which automatically adds the'algorithm' field since R2011b.

## Using `datenum`, `datestr`, `datevec` with dates in Financial products might produce inconsistent results

**Compatibility Considerations: Yes**

Any time you enter a cell array of date strings that are in different date formats using the MATLAB® functions `datenum`, `datestr`, and `datevec`, these functions previously returned an error. In R2013a, this behavior has changed. In Financial products this change can cause an unexpected date format to generate an incorrect value. For example, the following use of `datevec` returned an error before R2013a because of the inconsistent date formats, but in R2013a this code does not return an error.

```
datevec({'10-Oct-2012','10-1-2012'}),
```

### Compatibility Considerations

As a best practice, you should convert date strings to date numbers before using any functions in Financial Toolbox™ that use dates as inputs. For more information, see “No strict-match requirements for month formats when converting date strings” in the MATLAB release notes.

# R2012b

Version: 5.0
New Features: Yes
Bug Fixes: No

## Conditional value at risk (CVaR) portfolio optimization

New portfolio object `PortfolioCVaR` for conditional value at risk (CVaR) portfolio optimization.

# Margin and spread calculations for floating-rate bonds

Support for calculating spread measures for floating-rate bonds using `floatdiscmargin` and `floatmargin`.

## Total (horizon) return calculation for fixed-coupon bonds

Support for calculating bond horizon return using `bndtotalreturn`.

# Performance improvements for `cfamounts`

Performance improvement for calculating cash flows using `cfamounts`.

# R2012a

Version: 4.2
New Features: Yes
Bug Fixes: No

## XIRR Update

Support is added to `xirr` for a global search heuristic to enhance the robustness of `xirr`.

## Additional Support for Cash Flow Functions

| Function | Purpose |
|---|---|
| `cfspread` | Calculate the spread over a zero curve for a given cash flow. |
| `cfprice` | Calculate the price for a given cash flow given yield to maturity. |
| `cfyield` | Calculate the yield to maturity for a given cash flow and price. |

## New Demo for Portfolio Optimization Tools

A new demo shows how to set up mean-variance optimization problems using the portfolio object. Run the demo at the MATLAB command line by entering:

```
showdemo portfolioexamples
```

# R2011b

Version: 4.1
New Features: Yes
Bug Fixes: No

## One-Way Turnover Constraints Added to the Portfolio Object

The portfolio object supports one-way turnover constraints using the new methods `setOneWayTurnover` and `getOneWayTurnover`.

# Portfolio Optimization with Sharpe Ratio Maximization Using a Portfolio Object

The portfolio object supports estimating an efficient portfolio that maximizes the Sharpe ratio using the new method `estimateMaxSharpeRatio`.

## Cash Flow and Time Mapping for Bond Portfolios with Variable Coupon Rates and Variable Face Values

Updated `cfamounts` now supports time-varying `CouponRate` and `Face` scheduling, including support for sinking fund bonds.

## Transition Probability Functions for Credit Quality Thresholds, Nonsquare Matrices, and User-Defined Ratings

Support is added for credit quality thresholds with `transprobtothresholds` and `transprobfromthresholds`. Support is added for data preprocessing for `transprob` using `transprobprep`. Support is added for user-defined ratings and nonsquare transition matrices with `transprobgrouptotals` and `transprobbytotals`. For more information, see Credit Risk Analysis.

## New Demo for Forecasting Corporate Default Rates

A new demo shows how to forecast corporate default rates. This includes backtesting and stress testing examples. Run the demo at the MATLAB command line by entering:

```
showdemo Demo_DefaultRatesForecasts
```

## Functionality Being Removed

**Compatibility Considerations: Yes**

| Function Name | What Happens When You Use This Function | Use This Function Instead | Compatibility Considerations |
|---|---|---|---|
| `proddf` | Warns | `bndprice` | Replace all instances of `proddf` with `bndprice`. |
| `proddfl` | Warns | `bndprice` | Replace all instances of `proddfl` with `bndprice`. |
| `proddl` | Warns | `bndprice` | Replace all instances of `proddl` with `bndprice`. |
| `yldoddl` | Warns | `bndyield` | Replace all instances of `yldoddl` with `bndyield`. |
| `yldoddf` | Warns | `bndyield` | Replace all instances of `yldoddf` with `bndyield`. |
| `yldoddfl` | Warns | `bndyield` | Replace all instances of `yldoddfl` with `bndyield`. |
| `prbond` | Warns | `bndprice` | Replace all instances of `prbond` with `bndprice`. |
| `yldbond` | Warns | `bndyield` | Replace all instances of `yldbond` with `bndyield`. |
| `checksiz` | Warns | N/A | Remove all instances from your code. |
| `checktyp` | Warns | N/A | Remove all instances from your code. |
| `checkrng` | Warns | N/A | Remove all instances from your code. |

# Warning and Error ID Changes

**Compatibility Considerations: Yes**

Many warning and error IDs have changed from their previous versions. These warnings or errors typically appear during a function call.

## Compatibility Considerations

If you use warning or error IDs, you might need to change the strings you use. For example, if you turned off a warning for a certain ID, the warning might now appear under a different ID. If you use a `try/catch` statement in your code, replace the old identifier with the new identifier. There is no definitive list of the differences, or of the IDs that changed.

# transprobbytotals Warns When Using the algorithm Input Argument

**Compatibility Considerations: Yes**

The `totals` input to `transprobbytotals` is typically generated by `transprob`. Because `transprob` now includes an `algorithm` field in this structure, you no longer need to specify the `algorithm` argument when calling `transprobbytotals`.

## Compatibility Considerations

In a future release, specifying the `algorithm` argument to `transprobbytotals` will error. Currently, it is still permissible to specify the `algorithm` argument, although it usually has no effect.

# R2011a

Version: 4.0
New Features: Yes
Bug Fixes: No

## Portfolio Turnover and Transaction Costs

New portfolio object and methods support mean-variance portfolio optimization with general linear constraints, transaction costs, and turnover constraints. For more information, see Portfolio Optimization Tools and Portfolio Optimization Objects.

## Updated showdemo Command for Credit Rating Demo

The command to run the demo showing how to use Statistics Toolbox™ functions to support credit ratings is updated. Run the demo at the MATLAB command line by entering:

```
showdemo creditratingdemo
```

# R2010b

Version: 3.8
New Features: Yes
Bug Fixes: No

## Estimation of Transition Probabilities for Credit Risk

Support for estimation of transition matrices based on credit-migration history using both cohort and duration methods. For more information, see `transprob`, `transprobbytotals`, and Estimation of Transition Probabilities.

## Improved Performance in Portfolio Optimization Functions

`portopt` is enhanced for improved speed. Specifically, a broader class of problems now uses the faster linear complementarity programming (LCP) algorithm to obtain portfolios on the efficient frontier.

## New Demo for Credit Rating

A new demo shows how to use Statistics Toolbox functions to support credit ratings. Run the demo at the MATLAB command line by entering:

```
echodemo demo_creditrating
```

## New Input and Output Options for Swap Functionality

`cfamounts` is enhanced to support new parameter/value pairs for swap functionality.

# R2010a

Version: 3.7.1
New Features: No
Bug Fixes: No

No New Features or Changes

# R2009b

Version: 3.7
New Features: Yes
Bug Fixes: No

## Support for the BUS/252 Day-Count Convention

Support for the `Basis` day-count convention for BUS/252. BUS/252 is the number of business days between the previous coupon payment and the settlement data divided by 252. BUS/252 business days are non-weekend, non-holiday days. The `holidays.m` file defines holidays.

## Extended Support for New York Stock Exchange Closures

The current `holidays` function covers holidays and non-trading days from 1950 to 2050. Using `nyseclosures`, you can determine all known and anticipated closures from January 1, 1885 to December 31, 2050.

## Enhancements for Bond Pricing

Support for the following enhancements to bond pricing functions:

- Provide the ability to specify the compounding frequency separately from the coupon frequency.
- Enable specification of a discounting basis. A discounting basis has two purposes in Price/YTM calculations:
  - Computing the accrued interest
  - Computing the discount factors
- Support the specification of a formula for computing the interest in the last coupon period.

The enhanced bond pricing functions are:

| Function | Purpose |
|---|---|
| `accrfrac` | Calculate fraction of coupon period before settlement. |
| `bndprice` | Price fixed-income security from yield to maturity. |
| `bndyield` | Calculate yield to maturity for fixed-income security. |
| `bndspread` | Calculate static spread over spot curve. |
| `bnddurp` | Calculate bond duration given price. |
| `bnddury` | Calculate bond duration given yield to maturity. |
| `bndconvp` | Calculate bond convexity given price. |
| `bndconvy` | Calculate bond convexity given yield. |
| `cfamounts` | Calculate cash flow and time mapping for a bond portfolio. |
| `cftimes` | Calculate time factors corresponding to bond cash flow dates. |

# R2009a

Version: 3.6
New Features: Yes
Bug Fixes: No

## Support for Key Rate Duration

Added support for `bndkrdur` to calculate key rate duration for bonds to determine the sensitivities of a bond to nonparallel changes in the yield curve. For more information, see Calculating Key Rate Durations for Bonds.

# R2008b

Version: 3.5
New Features: No
Bug Fixes: No

No New Features or Changes

# R2008a

Version: 3.4
New Features: Yes
Bug Fixes: No

## Enhanced Mean-Variance Portfolio Optimization Based on Linear Complementarity Programming for Portfolio Optimization

Added support for `varargin` argument for `portopt` and `frontcon`.

## Support for Actual/365 (ISDA)

The following functions now support day count conventions for the `basis` argument based on ISDA (International Swap Dealers Association) actual/365:

- `accrfrac`
- `acrubond`
- `acrudisc`
- `bndconvp`
- `bndconvy`
- `bnddurp`
- `bnddury`
- `bndprice`
- `bndspread`
- `bndyield`
- `cfamounts`
- `cfdates`
- `cftimes`
- `cpncount`
- `cpndaten`
- `cpndatenq`
- `cpndatep`
- `cpndatepq`
- `cpndaysn`
- `cpnpersz`
- `datemnth`
- `daysadd`
- `daysdif`

- disc2zero
- discrate
- fvdisc
- fwd2zero
- prbyzero
- prdisc
- prmat
- pyld2zero
- time2date
- yeardays
- yearfrac
- ylddisc
- yldmat
- zbtprice
- zbtyield
- zero2disc
- zero2fwd
- zero2pyld

# Support for ret2tick and tick2ret Functions for Time Series Objects

`ret2tick` and `tick2ret` support financial time series objects.

## Support for Additional Descriptive Statistics Functions Financial Times Series Objects

The following covariance methods now support a financial time series object:

- `corrcoef`
- `cov`
- `isempty`
- `nancov`
- `nanmax`
- `nanmedian`
- `nanmin`
- `nanstd`
- `nansum`
- `nanvar`
- `var`

## Added New Chart Types

Added support for the following chart types for financial reporting:

- `kagi`
- `renko`
- `linebreak`
- `priceandvol`
- `volarea`

# R2007b

Version: 3.3
New Features: Yes
Bug Fixes: No

## ISMA Support for 30/360 Basis as a Variant of 30/360E with Annual Compounding

The following functions now support day count conventions for the `basis` argument to support 30/360 International Securities Market Association (ISMA) convention as a variant of 30/360E with annual compounding:

- `accrfrac`
- `acrubond`
- `acrudisc`
- `bndconvp`
- `bndconvy`
- `bnddurp`
- `bnddury`
- `bndprice`
- `bndspread`
- `bndyield`
- `cfamounts`
- `cfdates`
- `cftimes`
- `cpncount`
- `cpndaten`
- `cpndatenq`
- `cpndatep`
- `cpndatepq`
- `cpndaysn`
- `cpnpersz`
- `datemnth`
- `daysadd`

- daysdif
- disc2zero
- discrate
- fvdisc
- fwd2zero
- prbyzero
- prdisc
- prmat
- pyld2zero
- time2date
- yeardays
- yearfrac
- ylddisc
- yldmat
- zbtprice
- zbtyield
- zero2disc
- zero2fwd
- zero2pyld

## createholidays Function Added for Different Trading Calendars

The `createholidays` function now supports `http://www.FinancialCalendar.com` trading calendars. This function can be used from the command line or from the Trading Calendars graphical user interface. Using `createholidays`, you can create `holiday.m` files, in conjunction with `FinancialCalendar.com` data, that can be used instead of the standard `holidays.m` that ships with Financial Toolbox software.

## Diagonal Covariance Matrix Support Added for Multivariate Normal Regression

The new diagonal covariance matrix estimation feature makes it possible to estimate large-scale factor models by treating the residual errors as being jointly independent. The following functions support `CovarFormat`, a new input argument:

- `ecmlsrmle`
- `ecmmvnrmle`
- `ecmmvnrfish`
- `ecmmvnrobj`
- `ecmmvnrstd`
- `mvnrfish`
- `mvnrmle`
- `mvnrobj`
- `mvnrstd`

## arith2geom and geom2arith Functions Added for Portfolio Analysis

Two new functions, `arith2geom` and `geom2arith`, support portfolio analysis.

# R2007a

Version: 3.2
New Features: Yes
Bug Fixes: Yes

## ISMA Support Added

The following functions now support the International Securities Market Association (ISMA) convention for the `basis` argument:

- `accrfrac`
- `acrubond`
- `acrudisc`
- `bndconvp`
- `bndconvy`
- `bnddurp`
- `bnddury`
- `bndprice`
- `bndspread`
- `bndyield`
- `cfamounts`
- `cfdates`
- `cftimes`
- `cpncount`
- `cpndaten`
- `cpndatenq`
- `cpndatep`
- `cpndatepq`
- `cpndaysn`
- `cpnpersz`
- `datemnth`
- `daysadd`
- `daysdif`

- disc2zero
- discrate
- fvdisc
- fwd2zero
- prbyzero
- prdisc
- prmat
- pyld2zero
- time2date
- yeardays
- yearfrac
- ylddisc
- yldmat
- zbtprice
- zbtyield
- zero2disc
- zero2fwd
- zero2pyld

# R2006b

Version: 3.1
New Features: Yes
Bug Fixes: No

## Investment Performance Metrics

The following new functions are added to compute common investment performance and risk-adjusted metrics:

- `sharpe`, computes the sharpe ratio.
- `inforatio`, computes information ratio and tracking error.
- `portalpha`, computes risk-adjusted alpha and return.
- `lpm`, computes sample lower partial moments.
- `elpm`, computes expected lower partial moments.
- `maxdrawdown`, computes the drop from maximum to minimum return over a period of time.
- `emaxdrawdown`, computes the returns that are transformed into a linear Brownian motion with drift.

# Financial Time Series Tool

Financial Time Series Tool (`ftstool`) is a new graphical user interface to support working with financial time series `FINTS` objects. `ftstool` interoperates with the Financial Time Series Graphical User Interface (`ftsgui`) and Interactive Charts (`chartfts`).

# R2006a

Version: 3.0
New Features: Yes
Bug Fixes: No

## Financial Time Series Toolbox Incorporated

As of this release the functionality previously available in Financial Time Series Toolbox has been incorporated into Financial Toolbox software. Financial Toolbox documentation has been modified to include the documentation previously available in the Financial Time Series User's Guide.

Because use of Financial Time Series Toolbox required the purchase and installation of Financial Toolbox software, all customers previously licensed for Financial Time Series Toolbox will continue to have access to it.

## Financial Time Series Frequency Conversion Functions Modified

The suite of time series frequency conversion functions (`todaily`, `toweekly`, `tomonthly`, `tosemi`, and `toannual`) has been extensively modified. Consult the function references in the Financial Toolbox User's Guide for specifics.

## Continuous Compounding Option Removed from plyd2zero

Continuous compounding is no longer available for `pyld2zero`. Compounding for this function is now consistent with compounding for the function `zero2pyld`. An error message is generated if you attempt to use continuous compounding with these functions.

# New Statistical Functions

The new functions in Version 3.0 of Financial Toolbox software fall into these four categories:



## Multivariate Normal Regression Without Missing Data

| | |
|---|---|
| `mvnrfish` | Fisher information matrix for multivariate normal or least-squares regression |
| `mvnrmle` | Multivariate normal regression (ignore missing data) |
| `mvnrobj` | Log-likelihood function for multivariate normal regression without missing data |
| `mvnrstd` | Evaluate standard errors for multivariate normal regression model |

## Multivariate Normal Regression With Missing Data (Expectation Conditional Maximization)

| | |
|---|---|
| `ecmmvnrfish` | Fisher information matrix for multivariate normal regression model |
| `ecmmvnrmle` | Multivariate normal regression with missing data |
| `ecmmvnrobj` | Log-likelihood function for multivariate normal regression with missing data |
| `ecmmvnrstd` | Evaluate standard errors for multivariate normal regression model |

### Least Squares Regression With Missing Data (Expectation Conditional Maximization)

| | |
|---|---|
| `ecmlsrmle` | Least-squares regression with missing data |
| `ecmlsrobj` | Log-likelihood function for least-squares regression with missing data |

### Financial Model Transformation Function

| | |
|---|---|
| `convert2sur` | Convert a multivariate normal regression model into a seemingly unrelated regression model |

# R14SP3

Version: 2.5
New Features: Yes
Bug Fixes: No

## New Statistical Functions

Version 2.5 introduces a set of financial statistical computation routines that compute values, such as mean and covariance, when there are missing data elements within a larger data set. These routines implement the Expectation Conditional Maximization (ECM) algorithm with various options that depend on the percentage of missing at random (MAR) data within the data set. The table below lists the functions that implement the ECM algorithm in Financial Toolbox software.

The following ECM functions have been added at this release.

### Expectation Conditional Maximization

| | |
|---|---|
| `ecmnfish` | Fisher information matrix |
| `ecmnhess` | Hessian of negative log-likelihood function |
| `ecmninit` | Initial mean and covariance |
| `ecmnmle` | Mean and covariance of incomplete multivariate normal data |
| `ecmnobj` | Negative log-likelihood function |
| `ecmnstd` | Standard errors for mean and covariance of incomplete data |