

# **Financial Toolbox™ Release Notes**

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*Financial Toolbox™ Release Notes*

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## Summary by Version

This table provides quick access to what's new in each version. For clarification, see "Using Release Notes" on page 2.

<b>Version (Release)</b>	<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
<b>Latest Version V4.1 (R2011b)</b>	Yes Details	Yes Summary	Bug Reports
V4.0 (R2011a)	Yes Details	No	Bug Reports
V3.8 (R2010b)	Yes Details	No	Bug Reports
V3.7.1 (R2010a)	No	No	Bug Reports
V3.7 (R2009b)	Yes Details	No	Bug Reports
V3.6 (R2009a)	Yes Details	No	Bug Reports
V3.5 (R2008b)	No	No	Bug Reports
V3.4 (R2008a)	Yes Details	No	Bug Reports
V3.3 (R2007b)	Yes Details	No	Bug Reports
V3.2 (R2007a)	Yes Details	No	Bug Reports Includes fixes
V3.1 (R2006b)	Yes Details	No	Bug Reports
V3.0 (R2006a)	Yes Details	No	Bug Reports
V2.5 (R14SP3)	Yes Details	No	Bug Reports

## Using Release Notes

Use release notes when upgrading to a newer version to learn about:

- New features
- Changes
- Potential impact on your existing files and practices

Review the release notes for other MathWorks® products required for this product (for example, MATLAB® or Simulink®). Determine if enhancements, bugs, or compatibility considerations in other products impact you.

If you are upgrading from a software version other than the most recent one, review the current release notes and all interim versions. For example, when you upgrade from V1.0 to V1.2, review the release notes for V1.1 and V1.2.

## What Is in the Release Notes

### New Features and Changes

- New functionality
- Changes to existing functionality

### Version Compatibility Considerations

When a new feature or change introduces a reported incompatibility between versions, the **Compatibility Considerations** subsection explains the impact.

Compatibility issues reported after the product release appear under Bug Reports at the MathWorks Web site. Bug fixes can sometimes result in incompatibilities, so review the fixed bugs in Bug Reports for any compatibility impact.

### Fixed Bugs and Known Problems

MathWorks offers a user-searchable Bug Reports database so you can view Bug Reports. The development team updates this database at release time

and as more information becomes available. Bug Reports include provisions for any known workarounds or file replacements. Information is available for bugs existing in or fixed in Release 14SP2 or later. Information is not available for all bugs in earlier releases.

Access Bug Reports using your MathWorks Account.

## **Documentation on the MathWorks Web Site**

Related documentation is available on [mathworks.com](http://mathworks.com) for the latest release and for previous releases:

- Latest product documentation
- Archived documentation

## Version 4.1 (R2011b) Financial Toolbox Software

This table summarizes what's new in Version 4.1 (R2011b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	Yes Summary	Bug Reports

New features and changes introduced in this version are:

- “One-Way Turnover Constraints Added to the Portfolio Object” on page 4
- “Portfolio Optimization with Sharpe Ratio Maximization Using a Portfolio Object” on page 4
- “Cash Flow and Time Mapping for Bond Portfolios with Variable Coupon Rates and Variable Face Values” on page 5
- “Transition Probability Functions for Credit Quality Thresholds, Nonsquare Matrices, and User-Defined Ratings” on page 5
- “New Demo for Forecasting Corporate Default Rates” on page 5
- “Functionality Being Removed” on page 5
- “Warning and Error ID Changes” on page 6
- “transprobbytotals Warns When Using the algorithm Input Argument” on page 7

### 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 `transprobbytals`. 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

Function Name	What Happens When You Use This Function	Use This Function Instead	Compatibility Considerations
<code>proddf</code>	Warns	<code>bndprice</code>	Replace all instances of <code>proddf</code> with <code>bndprice</code> .
<code>proddf1</code>	Warns	<code>bndprice</code>	Replace all instances of <code>proddf1</code> with <code>bndprice</code> .
<code>proddl</code>	Warns	<code>bndprice</code>	Replace all instances of <code>proddl</code> with <code>bndprice</code> .

<b>Function Name</b>	<b>What Happens When You Use This Function</b>	<b>Use This Function Instead</b>	<b>Compatibility Considerations</b>
yldodd1	Warns	bndyield	Replace all instances of yldodd1 with bndyield.
yldoddf	Warns	bndyield	Replace all instances of yldoddf with bndyield.
yldoddf1	Warns	bndyield	Replace all instances of yldoddf1 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

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.

## **transprobytotals Warns When Using the algorithm Input Argument**

The totals input to `transprobytotals` 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 `transprobytotals`.

### **Compatibility Considerations**

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

## Version 4.0 (R2011a) Financial Toolbox Software

This table summarizes what's new in Version 4.0 (R2011a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports

New features and changes introduced in this version are:

- “Portfolio Turnover and Transaction Costs” on page 8
- “Updated showdemo Command for Credit Rating Demo” on page 8

### 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
```

## Version 3.8 (R2010b) Financial Toolbox Software

This table summarizes what's new in Version 3.8 (R2010b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports

New features and changes introduced in this version are:

- “Estimation of Transition Probabilities for Credit Risk” on page 9
- “Improved Performance in Portfolio Optimization Functions” on page 9
- “New Demo for Credit Rating” on page 9
- “New Input and Output Options for Swap Functionality” on page 10

### 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`, `transprobbytota1s`, 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.

# Version 3.7.1 (R2010a) Financial Toolbox Software

This table summarizes new features in Version 3.7.1 (R2010a):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
No	No	Bug Reports

There are no new features or changes in this version.

## Version 3.7 (R2009b) Financial Toolbox Software

This table summarizes new features in Version 3.7 (R2009b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports

New features introduced in this version are:

- “Support for the BUS/252 Day-Count Convention” on page 12
- “Extended Support for New York Stock Exchange Closures” on page 12
- “Enhancements for Bond Pricing” on page 12

### 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:

<b>Function</b>	<b>Purpose</b>
accfrac	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.

## Version 3.6 (R2009a) Financial Toolbox Software

This table summarizes new features in Version 3.6 (R2009a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports

New feature introduced in this version is:

### 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”.

## Version 3.5 (R2008b) Financial Toolbox Software

This table summarizes new features in Version 3.5 (R2008b):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
No	No	Bug Reports

There are no new features or changes in this version.

## Version 3.4 (R2008a) Financial Toolbox Software

This table summarizes new features in Version 3.4 (R2008a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports

New features and changes introduced in this version are:

- “Enhanced Mean-Variance Portfolio Optimization Based on Linear Complementarity Programming for Portfolio Optimization” on page 16
- “Support for Actual/365 (ISDA)” on page 16
- “Support for ret2tick and tick2ret Functions for Time Series Objects” on page 18
- “Support for Additional Descriptive Statistics Functions Financial Times Series Objects” on page 18
- “Added New Chart Types” on page 19

### 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

## Version 3.3 (R2007b) Financial Toolbox Software

This table summarizes new features in Version 3.3 (R2007b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports

New features and changes introduced in this version are:

- “ISMA Support for 30/360 Basis as a Variant of 30/360E with Annual Compounding” on page 20
- “createholidays Function Added for Different Trading Calendars” on page 22
- “Diagonal Covariance Matrix Support Added for Multivariate Normal Regression” on page 22
- “arith2geom and geom2arith Functions Added for Portfolio Analysis” on page 23

### 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:

- `accfrac`
- `acrubond`
- `acrudisc`
- `bndconvp`
- `bndconvy`
- `bnddurp`
- `bnddury`



- `bndprice`
- `bndsread`
- `bndyield`
- `cfamounts`
- `cfdates`
- `cftimes`
- `cpncount`
- `cpndaten`
- `cpndateng`
- `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:

- `ecmlsrml`
- `ecmmvnrml`
- `ecmmvnrfish`
- `ecmmvnrobj`
- `ecmmvnrstd`
- `mvnrfish`
- `mvnrml`

- mvnrobj
- mvnrstd

## **arith2geom and geom2arith Functions Added for Portfolio Analysis**

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

## Version 3.2 (R2007a) Financial Toolbox Software

This table summarizes new features in Version 3.2 (R2007a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports Includes fixes

### ISMA Support Added

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

- `accfrac`
- `acubond`
- `acudisc`
- `bndconvp`
- `bndconvy`
- `bnddurp`
- `bnddury`
- `bndprice`
- `bndspread`
- `bndyield`
- `cfamounts`
- `cfdates`
- `cftimes`
- `cpncount`
- `cpndaten`
- `cpndatenq`
- `cpndatep`

- cpndatepq
- cpndaysn
- cpnpersz
- datemnth
- daysadd
- daysdif
- disc2zero
- discraterate
- fvdisc
- fwd2zero
- prbyzero
- prdisc
- prmat
- pyld2zero
- time2date
- yeardays
- yearfrac
- ylddisc
- yldmat
- zbtprice
- zbtyield
- zero2disc
- zero2fwd
- zero2pyld

## Version 3.1 (R2006b) Financial Toolbox Software

This table summarizes new features in Version 3.1 (R2006b):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports

New features and changes introduced in this version are:

- “Investment Performance Metrics” on page 26
- “Financial Time Series Tool” on page 26

### 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`).

## Version 3.0 (R2006a) Financial Toolbox Software

This table summarizes new features in Version 3.0 (R2006a):

New Features and Changes	Version Compatibility Considerations	Fixed Bugs and Known Problems
Yes Details below	No	Bug Reports

New features and changes introduced in this version are:

- “Financial Time Series Toolbox Incorporated” on page 27
- “Financial Time Series Frequency Conversion Functions Modified” on page 27
- “Continuous Compounding Option Removed from `plyd2zero`” on page 28
- “New Statistical Functions” on page 28

### 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 (`todayly`, `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 `plyd2zero`. Compounding for this function is now consistent with compounding for the function `zero2plyd`. 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” on page 28
- “Multivariate Normal Regression With Missing Data (Expectation Conditional Maximization)” on page 29
- “Least Squares Regression With Missing Data (Expectation Conditional Maximization)” on page 29
- “Financial Model Transformation Function” on page 29

### Multivariate Normal Regression Without Missing Data

<code>mvnrfish</code>	Fisher information matrix for multivariate normal or least-squares regression
<code>mvnrmlc</code>	Multivariate normal regression (ignore missing data)
<code>mvnrobj</code>	Log-likelihood function for multivariate normal regression without missing data
<code>mvnrstd</code>	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
ecmmvnrmlc	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)**

ecmlsrmlc	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
-------------	--

## Version 2.5 (R14SP3) Financial Toolbox Software

This table summarizes what's new in Version 2.5 (R14SP3):

<b>New Features and Changes</b>	<b>Version Compatibility Considerations</b>	<b>Fixed Bugs and Known Problems</b>
Yes Details below	No	Bug Reports

### 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

ecmfish	Fisher information matrix
ecmhess	Hessian of negative log-likelihood function
ecmnit	Initial mean and covariance
ecnmle	Mean and covariance of incomplete multivariate normal data
ecmobj	Negative log-likelihood function
ecmstd	Standard errors for mean and covariance of incomplete data

## Compatibility Summary for Financial Toolbox Software

This table summarizes new features and changes that might cause incompatibilities when you upgrade from an earlier version, or when you use files on multiple versions. Details are provided with the description of the new feature or change.

Version (Release)	New Features and Changes with Version Compatibility Impact
<b>Latest Version V4.1 (R2011b)</b>	See the <b>Compatibility Considerations</b> subheading for each of these new features and changes: <ul style="list-style-type: none"> <li>• “Functionality Being Removed” on page 5</li> <li>• “Warning and Error ID Changes” on page 6</li> <li>• “transprobytotals Warns When Using the algorithm Input Argument” on page 7</li> </ul>
V4.0 (R2011a)	None
V3.8 (R2010b)	None
V3.7.1 (R2010a)	None
V3.7 (R2009b)	None
V3.6 (R2009a)	None
V3.5 (R2008b)	None
V3.4 (R2008a)	None
V3.3 (R2007b)	None
V3.2 (R2007a)	None
V3.1 (R2006b)	None
V3.0 (R2006a)	None
V2.5 (R14SP3)	None