Financial Derivitives Toolbox Release Notes

The “Financial Derivatives Toolbox 2.0 Release Notes” on page 1-1 describe the changes introduced in the latest version of the Financial Derivitives Toolbox.

The Financial Derivitives Toolbox Release Notes also provide information about an earlier version of the product, in case you are upgrading from a version that was released prior to Release 12. If you are upgrading from a release earlier than Release 12, you should also see “Financial Derivatives Toolbox 1.0 Release Notes” on page 2-1.

Contents

1

Financial Derivatives Toolbox 2.0 Release Notes

New Features

This section introduces the new features and enhancements added in the Financial Derivatives Toolbox 2.0 since Version 1.0 (Release 12.1).

Note The Financial Derivatives Toolbox 2.0 was initially released in Web-downloadable form after Release 12.1 was released, but before Release 13. There are no changes between the post-Release 12.1 version of the Financial Derivatives Toolbox 2.0 and the version shipped with Release 13.

Black-Derman-Toy Model

Version 2.0 of the Financial Derivatives Toolbox adds support for the Black-Derman-Toy (BDT) model for pricing interest rate derivatives. In the BDT model all security prices and rates depend upon the short rate (annualized one-period interest rate). The model uses long rates and their volatilities to construct a tree of possible future short rates. It then determines the value of interest rate sensitive securities from this tree.

The Black-Derman-Toy model works with a recombining tree. A recombining tree is the opposite of a bushy tree (used with the Heath-Jarrow-Morton (HJM) introduced in Version 1). A recombining tree has branches that recombine over time. From any given node, the node reached by taking the path up-down is the same node reached by taking the path down-up.

New Functions in Version 2.0

The following set of functions has been added to the toolbox to support operations with the BDT model. These functions are the counterparts of the HJM functions from Version 1.

Fixed Income Pricing and Sensitivity from Black-Derman-Toy Tree

Function	Purpose
`bdtprice`	Fixed income instrument prices by BDT interest rate tree
`bdtsens`	Fixed income instrument prices and sensitivities by BDT interest rate tree
`bdttimespec`	Specify time structure for BDT interest rate tree
`bdttree`	Construct BDT interest rate tree
`bdtvolspec`	BDT volatility process specification

Black-Derman-Toy Utilities

Function	Purpose
`bondbybdt`	Price bond by BDT interest rate tree
`capbybdt`	Price cap by BDT interest rate tree
`cfbybdt`	Price arbitrary set of cash flows by BDT interest rate tree
`fixedbybdt`	Price fixed rate note by BDT interest rate tree
`floatbybdt`	Price floating rate note by BDT interest rate tree
`floorbybdt`	Price floor instrument by BDT interest rate tree
`mmktbybdt`	Create money market tree from BDT
`optbndbybdt`	Price bond option by BDT interest rate tree
`swapbybdt`	Price swap instrument by BDT interest rate tree

Black-Derman-Toy Recombining Tree Manipulation

Function	Purpose
`mktree`	Create recombining tree
`treepath`	Extract entries from node of recombining tree
`treeshape`	Retrieve shape of recombining tree

2

Financial Derivatives Toolbox 1.0 Release Notes

Introduction to the Financial Derivatives Toolbox

The Financial Derivatives Toolbox extends the Financial Toolbox in the areas of fixed income derivatives and of securities contingent upon interest rates. The toolbox provides components for analyzing individual financial derivative instruments and portfolios composed of them. Specifically, it provides the necessary functions for calculating prices and sensitivities, for hedging, and for visualizing results.

Interest Rate Models

The Financial Derivatives Toolbox computes pricing and sensitivities of interest rate contingent claims based upon sets of zero coupon bonds or the Heath-Jarrow-Morton (HJM) evolution model of the interest rate term structure.

Hedging

The Financial Derivatives Toolbox also includes hedging functionality, allowing the rebalancing of portfolios to reach target costs or target sensitivities, which may be set to zero for the case of a neutral-sensitivity portfolio. Optionally, the rebalancing process can be self-financing or directed by a set of user-supplied constraints.

Financial Instruments

The toolbox provides a set of functions that perform computations upon portfolios containing up to seven types of financial instruments.

Bond. A long-term debt security with preset interest rate and maturity, by which the principal and interests must be paid.

Bond Options. Puts and calls on portfolios of bonds.

Fixed Rate Note. A long-term debt security with preset interest rate and maturity, by which the interests must be paid. The principal may or may not be paid at maturity. In this version of the Financial Derivatives Toolbox, the principal is always paid at maturity.